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WILDLIFE IN NORTH CAROLINA

JANUARY 1978

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Mitchell: Man and Mountain

"It was as they expected. The deceased had undertaken to go the same route to the settlements which he had formerly gone. They traced him rapidly down the precipices of the mountain, until they reached the stream (Cat-tail Fork), found his traces going down it — following on a 100 yards or so, they came to a rushing cataract some 40 feet high, saw his footprints trying to climb around the edge of the yawning precipice, saw the moss torn up by the outstretched hand, and then — the solid, impressionless granite refused to tell more of his fate. But clambering hastily to the bottom of the roaring abyss, they found a basin worn out of the solid rock by the frenzied torrent, at least 14 feet deep, filled with clear and crystal waters cold and pure as the winter snow that generates them. At the bottom of this basin, quietly reposing, with outstretched arms, lay the mortal remains of the Reverend Elisha Mitchell, D. D. . . ."

So wrote Zeb B. Vance (later to be Governor of North Carolina) in the July, 1857, "Asheville Spectator." Dr. Elisha Mitchell — the man who first measured the mountain named for him and discovered it to be the highest peak east of the Rockies — was dead.

Mitchell's tragic death and the fame he bought to a mountain may be the events most readily associated with him, but these by no means tell the whole story of this brilliant and seemingly tireless adopted North Carolinian. His accomplishments as an educator in the natural sciences, combined with his unflagging curiosity, left a lasting mark on the State.

Born in Washington, Connecticut, on April 19, 1793, Mitchell graduated from Yale in 1813. In 1818, he came to the University of North Carolina as a professor of mathematics and natural philosophy (there were a mere 120 students at the University then). Throughout a long and illustrous career, he taught and influenced many students who were later to distinguish themselves. Mitchell also extended his fields of interest and employment to include chemistry, geology and mineralogy, earning the affectionate title of "College Encyclopedia."

Samuel A. Ashe, in the Biographical History of North Carolina, describes Mitchell as a man "greatly esteemed, filling many functions most acceptably. He was the college treasurer; he was justice of the peace, a farmer, a commissioner for the village of Chapel Hill, and at times its magistrate of police; and he was a regular preacher in the college chapel and the village church." Mitchell became intrigued by the unsubstantiated opinions of a number of naturalists that the peaks of Black Mountains in Yancey County — especially the tallest one called Black Dome — might be the highest in the East. In 1835, he launched an expedition to the wild and lightly settled area to verify the theories by barometrical measurement. He determined that the Black Dome towered 6,476 feet above sea level (later corrected to 6,684 feet). Mt. Washington in New Hampshire (at 6,288 feet) had lost its claim as the highest mountain in the East. In 1844, Mitchell again visited the mountain to make further measurements. Later, in recognition, the tallest peak was named for him, though not without evoking widespread controversy. General Thomas L. Clingman climbed Mt. Mitchell in 1855 and forthwith claimed that Mitchell had never been on the tallest peak. Clingman sought to have the mountain renamed in his own honor. Following a heated exchange of letters in the press, Mitchell returned again to the mountain in 1857 to remeasure it and gather statements from those who had guided him on earlier visits.

On Saturday, June 27, Mitchell decided to quit work and cross the mountain to visit his former guide, Big Tom Wilson on Caney River. He was never seen alive again and Wilson discovered the body following a week-long search involving more than 50 mountain men.

Time and reason have decided the controversy in favor of Mitchell, and his body now rightfully lies in a grave on top of his mountain . . . a lasting memorial to our natural heritage.

By Jim Dean

WILDLIFE IN NORTH CAROLINA

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Each winter, North Carolina is home to many migratory birds who ride the cold winds out of the north. Here are four you might expect to see this month.

Winter Birds

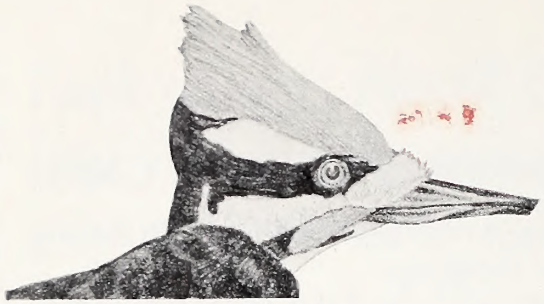
Winter intensifies the relationships between birds and humans. Many species forage closer to human habitations then as purely wild food supplies dwindle. Some freely enter our dooryards to glean our wasted or planted foods or to accept the food we intentionally provide for them. Others remain wary and keep to the fields, marshes and woodlands, but because of the seasonal defoliation, they are more readily sighted.

The wintering bird population in the uplands of the Carolinas and nearby states is composed of a predictable set of species. After the warm-weather birds who nested with us emigrate southward and after the northern migrants traverse the region on their way to the tropics, the region is left with its corps of wintering stalwarts. Our wintering birds include many who have arrived from the north and about twice that number who share with us the fortunes of all seasons but who come

written and photographed by Michael A. Godfrey

Far left, Eastern Bluebird; lower left, Red-tailed Hawk; left, Redwing Blackbird; below, Pileated Woodpecker.

into our awareness most strongly in winter. Birds such as the chickadees, the titmice and even the vocal and flashy cardinals retire into the foilage during the nesting season. They concentrate then on insects for their own nourishment and for that of their insatiably hungry young. Autumn reduces the availability of insects and presents the birds with a sequence of ripening fruits and seeds. By winter the birds' diet has shifted almost entirely to seeds and to the persisting fruit of a few important plants, including dogwood, poke, black gum and honeysuckle. Those birds anatomically unsuited to making this dietary shift move southward in pursuit of flying insects or flowers or whatever their specialty may be. The constant search for ever-dwindling food supplies obliges the remaining birds to exploit every opportunity for feeding, even if that brings them into contact with humans. Emboldened by hunger, birds in winter become much more a force in our lives than in the warmer months when food is no problem for them.



PILEATED WOODPECKER

FIELD MARKS: A very large woodpecker — as large as a crow. The back and underparts are principally black. A broad white stripe runs from the base of the bill to the rear of the head and down the sides of the neck. A crest slopes upward from the bill, peaking above the rear of the head. The male's crest is entirely red, as are his moustachelike markings. The female lacks the red moustache, and only the rear half of her crest is red. White shows beneath the wings in flight.

LENGTH: 15 inches.

VOICE: A series of wild, loud KUKs similar to the flicker's but slower and softer toward the end.

RANGE IN OUR REGION: Can be found in some localities in all seasons throughout the Carolinas and nearby states.

HABITAT: Mature deciduous and mixed forests in large tracts.

Size is this woodpecker's most impressive feature. Because it is uncommon, we see the pileated infrequently, and each sighting is memorable. Even the seasoned observer must adjust to the idea of a woodpecker the size of a crow.

One January day in Orange County, North Carolina, I had an opportunity to make the often-used comparison firsthand. I saw three birds that looked like crows flying at treetop height across an open field. All were large, black and of equal size. The rearward two were harassing the lead bird with noisy but cautious attacks. I had never seen crows attack one another, and I began to watch carefully. I noticed that the forward bird, flying on an unperturbed course, had an irregular wingbeat. Then the low sun flashed in the white under its wings, and I knew it was a pileated. The flight pattern and wing markings, rather than the size, distinguished the woodpecker from the crows.

The "logcock," as Yankee woodsmen know him, resembles the nearby extinct ivory-billed, an even larger woodpecker. It was once possible to confuse the two in the southeastern United States, but now only the pileated remains. Logging and the draining of the swamps eliminated the ivorybill. The more versatile pileated survived the destruction of forests in the nineteenth century by retreating to small enclaves in the uplands. Even there, the pileated was shot for food by market hunters and persecuted to near extinction. It somehow lived through this unenlightened period, an environmental dark age from which the continent has never fully recovered.

RED-WINGED BLACKBIRD

FIELD MARKS: The male is solid black with red shoulder patches edged in yellow. The female is brownish with bold brown streaking on the breast.

LENGTH: 7¼ inches.

VOICE: The call is a rich CHUCK. The song, which begins in winter, is a bubbling, musical OAK-A-LEEEE.

RANGE IN OUR REGION: Nests in all sections. Abandons the higher mountain elevations in winter.

HABITAT: Fields, marches, livestock pens.

The redwing is one of the most numerous birds in the world. Like the common grackle it is a legitimate, not alien, North American species that has benefited greatly from humanity's alterations to the land. Largescale agriculture has become a principal source of fall and winter food for the redwing, as well as for other gregarious blackbirds including the starling, the brown-headed cowbird and the common grackle. Much of the grain these birds take would otherwise be wasted. Weed seeds and undigested material in livestock manure are also important foods.

In winter redwings gather in large flocks to forage in the fields and barnyards, sometimes mixing with starlings, grackles and cowbirds. Flocks of redwings wheel and turn in tight clusters while individual birds rise and fall within the flock. With the lengthening days of February, males desert the great wintering flocks and claim their breeding territories in ponds and marshes. Gripping a reed or willow twig, the male hunches his shoulders forward to display his crimson epaulets and sings his OAK-A-LEE lovesong. When the females arrive, they must seek the male's permission to nest within his territory, and they must be prepared to incubate their eggs and raise their brood unaided.

First-year males with their brown feather edgings and muted shoulder patches are not attractive to the females and are not tolerated on the territories of mature males. As a result, an excess of available females develops in some localities, and the stronger males become polygamous. In early spring a well-situated male may divide his attentions among as many as five of the sparrow-brown ladies, displaying before each and escorting them on their labors about the territory as they gather nesting material and food. He does not, however, condescend to participate in any domestic effort except the mating act.

RED-TAILED HAWK

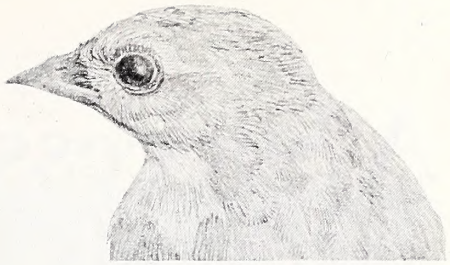
FIELD MARKS: The tail is uniformly reddish above, light brown below. Bands are visible across the juvenile's tail. The wings and underparts seen from beneath appear whitish with a rusty brown band across the chest. A black edging outlines the underside of the wing. A dark marking extends down the side of the neck and may cover the throat. The amount of dark on the underparts is highly variable. The sexes are indistinguishable.
LENGTH: 18 inches.
WINGSPAN: 48 inches.
VOICE: A loud, screaming KEE-AAHHRR.
RANGE IN OUR REGION: Winters and nests throughout.
HABITAT: Soars over open fields. Roosts and nests in woods.

The red-tail is the largest and most common soaring hawk in our region. It perches for long periods atop a utility pole or dead snag, resting and watching for prey on the ground. On its hunting perch, the red-tail is recognized at a distance by the whitish front, erect posture and broad, thick body. From the rear, the rusty tail hangs conspicuously from beneath the brown back and wings.

With eyesight many times keener than man's, the red-tail spots a cotton rat running between two clumps of broom sedge a hundred yards away. The big buteo leaps into the wind and thrusts a few times with its broad wings, then catches an updraft for a free ride. Arriving over the quarry, the hawk plummets to earth, seizes the rat, and returns to its perch to dine, preen and rest.

The red-tail is a soaring bird with broad, rounded wings and slotted primary flight feathers adapted for riding the currents of air rising from the surface as a result of the sun's warmth. It wheels in wide circles, easily gaining hundreds of feet of altitude without flapping a wing. On clear winter days, we see the red-tail's whitish underparts as it soars effortlessly above us, and occasionally we catch a glimpse of the red upper tail shining in the sun as the hunter of the open spaces banks to turn.

The red-tail's diet has often—and unfairly—been called into question by poultry owners. Rodents are the staple food source for the red-tail, and a hawk hanging around a hen house is much more likely watching for grain-thieving rats than for chickens.



EASTERN BLUEBIRD

FIELD MARKS: The male has brilliant blue upperparts. The female is a dusky gray or brown with blue in the wings and tail. Both sexes have a rusty throat and breast and white lower underparts. They sit perched with slightly hunched shoulders.
LENGTH: 5½ inches.
VOICE: A sweet, slurred warble, CHER-WEET.
RANGE IN OUR REGION: Winters in all localities except higher mountains. Nests throughout.
HABITAT: Sits on open perches along roadsides, in farmyards and in orchards.

The small size and the uncrested head of the bluebird easily distinguish it from the blue jay, the only other bluish bird wintering in our region. Confused identities are more likely in warmer months, when indigo buntings and blue grosbeaks join the bluebirds nesting in our region. The bluebird's diagnostic marking is the rusty band across the chest and down the side, possessed by no other bird in our region in any season.

The bluebird's soft, cheerful notes beckon us to the window on a winter day. The male's deep blue cloak and rusty sash brighten the dooryard as he hovers before alighting at the feeder. His slightly less colorful lady joins him, and the two move from perch to feeder, gently winging the air with the grace and charm of ballet performers.

The bluebird is principally an insect eater the year round. It hunts from an exposed perch, dropping down to nab unwary insects. Sometimes the downward swoop is interrupted by a tentative hovering while the bird watches the movements of its prey. The bluebird makes some lateral forays to catch insects on the wing.

The bluebird nests in abandoned woodpecker holes and other natural cavities, and readily accepts man-made nesting boxes. But civilization has been a mixed blessing to the bluebird, since it has brought with it not only birdhouses but humanity's near-parasites, the English sparrow and the starling. These pernicious aliens have all but eliminated the bluebird in some areas by usurping its nesting spaces. The celebrated naturalist John Terres, who worked with bluebirds in North Carolina, suggests that if the entrance to a nesting box is one inch in diameter, it will permit the bluebird to enter, yet will exclude the sparrow. Also, the bluebird will occupy a box placed as low as four feet off the ground, a height which discourages competition. Warning: Snake guards are an absolute necessity, for snakes frequently climb the post, enter the box and eat the eggs, young and adults. ◆

by Carl Betsill

A Successful Hunter Reveals His Secrets New Tactics For Cottontails

When a wildlife biologist moves into a new area of the State, the quickest way to get tuned to the problems and find out what's going on is to get acquainted with the local hunters. As a new biologist in Wilson, that is what I was doing when I met Eddie Lucus. It seemed that every time I mentioned rabbit hunting in Wilson County someone would mention Eddie's name. After this happened a dozen or so times I decided I had better look this fellow up.

When I walked into Eddie's place of business I was expecting to hear the usual statements like, "What's happened to the rabbit population?" or "Why don't we have rabbits like we used to?" But this time I decided to second guess this rabbit hunter, so the first question I asked was, "What do you think of the rabbit shortage?" To my surprise, Eddie's response was, "What rabbit shortage?" I couldn't believe my ears; had I finally stumbled onto a successful rabbit hunter? Could it be possible that here before my very eyes was a rabbit hunter with no complaints? This was a rare find indeed. Mr. Lucus told me that last season he and his hunting partners killed 258 rabbits in front of his dogs without leaving Wilson County. Furthermore, he had been hunting since he was nine and had never experienced problems finding plenty of rabbits. Last season, in spite of the bad weather, Eddie and his friends killed 209 with an average of over 13 per trip.

If there are any skeptics among you, let me put your doubts to rest. Ask Wildlife Commission personnel Charlie Woodhouse, Ted Dossett, or Curtis Wooten—all of whom came all the way from Raleigh when they heard I had found a successful rabbit hunter. Eddie graciously consented to take us all on a rabbit hunt and show us how it was done. Ted, Curtis and I were armed with cameras in order to get Eddie's secret techniques down on film.

What are his secrets? Eddie will be the first to tell you, it depends on the quality of dogs you have. It didn't take long in the field before I realized what he was talking about. Eddie has one of the finest beagle packs I have ever been in the field with. If you have ever seen a good jump dog work a briar patch, then imagine 10 such dogs working a patch of briars. Eddie has no loafers, and each one works just as hard as the other. This doesn't mean that once a rabbit gets up they won't fall in behind him either. When that pack opens up, it's guaranteed to double the heart beat of anyone who appreciates the sound of a good race.

It seems that good dogs are a necessity for rabbit hunting these days. In the past, it was nothing to

walk out and kick a few briar patches and kill all the rabbits you wanted. Why can't it be done nowadays? The most obvious answer is there are not as many rabbits. This is certainly true but it may not be the whole problem. As Eddie's record shows, there are rabbits out there if you can find them.

Rabbits seem to have changed their behavior within the past few years. By this I don't mean that rabbits have learned how to outsmart us, but rather that those rabbits with characteristics that make them easy to hunt don't survive to pass their traits on to the next generation; those cottontails which happen to like to bed in a hollow log or five feet up a hollow tree, do survive.

A pack of good beagles not only makes rabbit hunting a whole lot more fun, it often means the difference between success and failure. A. James Thomas, Sanford, doesn't have to urge these dogs to run rabbits.

You say you've never heard of cottontails in such places? Well neither had I until I became involved with some radio telemetry work with rabbits. By attaching radio transmitters to rabbits we were able to find their exact location at any time. Where did we find them? Well, some were in the usual places such as briar patches or brush piles, but a surprising number could be found back in the woods in hollow logs and up hollow trees. One was even found 10 feet back under a dry stream bed. Even with dogs, a rabbit would be mighty hard to jump out of a place like that.

The fact that rabbits may have changed their behavior can be further evidenced by observing Eddie's dogs hunt. One of their favorite places to hunt is trash piles. They never miss the opportunity to sniff large tin cans, in old rolls of wire, or under an old board. They won't pass up a hollow log or a stump hole, either.

This type of behavior change that seems to have taken place in rabbits has taken place in other heavily hunted game species as well. Ask any quail hunter who hunted 15 or 20 years ago. Ask if the birds hold to point as well nowadays and how easy it was in the past to get singles. I've heard a few hunters claim recently that after the covey is flushed many of the singles aligh in trees. It stands to reason that a bird that does this will surely survive to pass this characteristic along to his offspring.

The question arises, what can be done about this from a management standpoint. There is no way we can stop evolution. The law of the survival of the fittest will prevail. The only logical approach is to tackle problems we can do something about. It is realized in certain areas that there is a low population level and unsuccessful hunting cannot be blamed on merely a change in the behavior of the rabbit. In hopes of discovering the reason for these low populations, the Wildlife Commission now has a project underway studying the effects of pesticides on rabbits. There are plans in the future for other research projects on rabbits and other small game.

The dogs may have more pep at the end of day than you do! Mr. Thomas tries to convince the beagles that there's one more rabbit in this field.

The best advice for now is to get yourself a pack of good dogs and try hunting some of the less traditional habitat types. Also, walk the field borders but give your dogs plenty of time to hunt an area thoroughly. If no rabbits are jumped, keep moving along the border. The rabbits often seem to be clustered together and three or four may be killed in one small area; then you may walk a quarter of a mile before another is jumped. Eddie suggests hunting the east-facing side of a field early in the morning. He says the rabbits move to these areas to enjoy the warm morning sun.

Hunting success will vary with how active rabbits were the night before your hunt. If a rabbit has moved a great deal, he is more likely to leave a scent trail that can be followed to his bed site. For this reason, weather can be an important factor in hunting success. Trapping studies have shown that rabbit activity varies with differing weather conditions. Although there is some controversy among biologists, it is generally believed that barometric pressure is a major factor influencing animal activity. Rabbits are more active during periods of low barometric pressure. These periods are generally characterized by cloudy, damp, overcast conditions.

One study conducted in Ohio by Biologist James J. Humber indicated rabbits were more active between 29°F. and 49°F. Rabbit activity decreased with temperatures both above and below these figures. Maybe some people think that checking barometric pressures, temperature and cloud cover the night before a hunt may be getting a little too sophisticated for the sport. If this be the case, then consider the fisherman with his depth finders, oxygen meters and water temperature gauges.

We may have to work at it a lot harder but there are still opportunities for good rabbit hunting. Get yourself some good dogs and don't be afraid to try something different if your old techniques are not working.

Was It Really Better?
Hunting In The Good Old Days

by Jim Dean

What was hunting like in North Carolina 75 years ago? What was it like 150 years ago, or even earlier when Sir Walter Raleigh sent his ill-fated colonists to Roanoke Island?

Most people believe that hunting was better, much better, back in "the good old days." In some cases, that's undoubtedly true. And yet, the widely held notion that North Carolina's rich resources in wildlife have been in steady decline since the first white man set foot on the Outer Banks is not entirely accurate. Nor is it true that wildlife populations are endangered today as a result of more than 200 years of sport hunting. The issue is far more complex.

Indeed, a few species are thought to be more numerous today than at any time in recorded history, and virtually all have gone through "boom" or "bust" periods either because of man's influence on their habitat or because of natural cyclic fluctuations.

Take the white-tailed deer, for example. Like most animals, deer populations have waxed and waned many times over the past two centuries. When North Carolina was first being settled, deer were a major source of food not only for colonists, but also for Indians. But contrary to popular belief, the whitetail probably did not reach present population peaks in the mature forests which covered the State then. Deer prosper in new forests such as might be created by fire or timber cutting. Farming, especially when the crops are soybeans or corn, also favors deer.

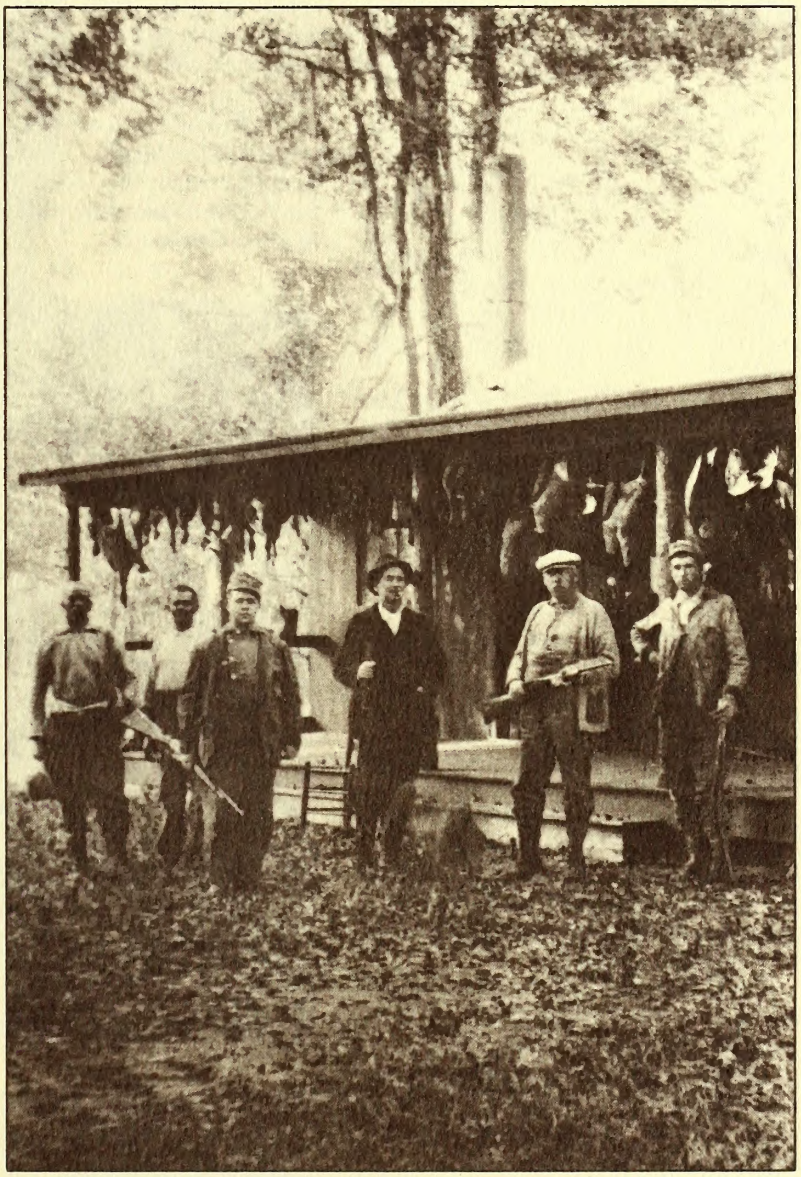
Because of this, North Carolina is thought to be more favorable for deer now, particularly in the East. The periodic cutting of selected eastern forests combined with current agriculture practices has

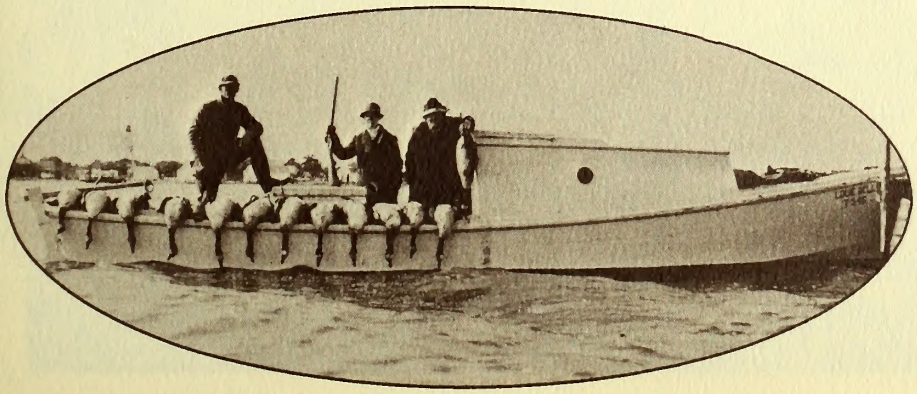
created a mixture of mature forest, regenerating forest and cropland that is ideal for deer. Biologists believe there is little doubt but what North Carolina has more deer in the eastern part of the State than ever before, and populations are growing and spreading in other parts of the State.

On the other hand, the black bear and the wild turkey—both considered big game species in North Carolina—have declined significantly over the past 200 or so years. Both favor mature forests, but unrestricted timber cutting in the State many years ago left few forests. More recently, the same farming practices that favor deer have taken huge bites of prime bear and turkey habitat. The bear and the turkey have lost many traditional homes.

Even so, the outlook is not entirely bleak. Under careful management, many forests have regrown since the massive timber cutting in the late 1800's and early 1900's, especially in the western part of the State. Because of this and because of restoration projects paid for by sportsmen, the wild turkey is making a comeback in many states including North Carolina. At present, the bear is thought to be holding his own in the State, although his habitat is disappearing rapidly in the East. Still, his extinction is hardly imminent, and

The days of goose necklaces like those these waterfowlers are wearing in this 1928 photo (left) may be gone at Currituck and Mattamuskeet, but only because our Canada geese now winter farther north. Today, geese are more plentiful in the Atlantic Flyway than ever. Two unidentified women apparently shot the honkers that line the rail of the "Louie Dell." (bottom) The date is unknown, but sharp eyes may identify the Ocracoke Light in the background. Waterfowl line the rafters in this photograph (below) thought to have been taken at Lake Ellis over 50 years ago.





current research combined with an extensive bear sanctuary program may help turn the tide.

Estimating the status of small game populations over the past 200 years is not so simple, but biologists can draw on old reference materials as well as their knowledge of the habitat preferences of various species.

The bobwhite quail has been the most popular upland game bird in the State for as long as anyone living

can remember. Back before the State was widely settled and farmed, the bobwhite is thought to have been less abundant than now because these birds do not prefer mature forests.The heyday of the bobwhite probably occurred during the early part of this century up until about 1960. There were many small farms spread across the State, making up a dense patchwork of ideal quail habitat. More recently, spreading civilization and the trend toward huge farms are changing this habitat again. Pesticides and herbicides may also be affecting small game. Even so, quail are doing very well, but it's unlikely that they will soon return to the abundance they enjoyed in the early part of this century.

Rabbits are highly cyclical by nature—abundant one year and scarce the next—but over the years, their population has closely paralleled quail because their habitat needs are similar. In the past few years, rabbits seem to be in a low cycle, but there is no reason to believe they will not again reach former peaks.

Squirrels have also traditionally gone through periods of abundance and relative scarcity, yet they remain the State's most popular small game animal. Their favored habitat is a mature hardwood forest, and despite the decline in this kind of habitat in some parts of the State, grey squirrels seem to be adapting and even flourishing.

Overall, waterfowl species have declined during the past few decades, primarily because of loss of breeding grounds and unfavorable weather in the far north. Still, intense management and habitat improvement techniques are being used, and past successes offer reasonable hope. The snow goose has come back dramatically through management, and although the Canada goose no longer visits North Carolina in huge numbers, it is not because of a population decline. Canadas are more numerous than ever, but they winter farther north now because farming practices are favorable there.

The history of the wood duck is both interesting and encouraging

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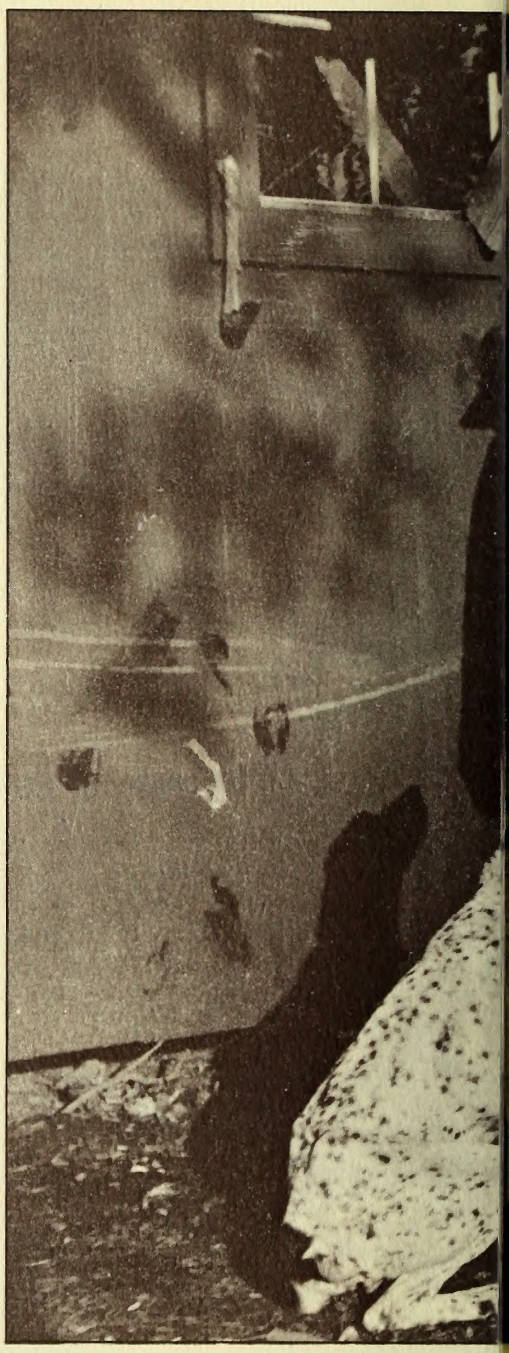
Traditionally, women have let men do most of the hunting, but this lass (below) in the long skirt looks right at home with that hammer shotgun in this late 19th century photo shot in western North Carolina. Looks like she's been successful too. Is that a turkey, a brace of grouse or some other kind of game slung on that cord at her waist? Last winter was a cold one, but 60 years ago, these hunters (below right) could drag a deer across the frozen New River in Onslow County. We can only guess what compliments the late Tom Keller might have lavished on this pointer (right) in 1909 at Camp Bryan in Craven County, but that sure is a fine looking L. C. Smith double he's holding. Camp Bryan in 1908 is also the scene of this Faulknerian wagonload of deer hunters. (bottom)



Some Things Never Change

Chasing Chatham Whitetails In 1830

In the October, 1830, issue of the American Turf Register, there appears a letter from a gentleman who identifies himself only as "H." Mr. "H" describes a deer hunt in Chatham County the previous winter, and it is interesting to note that not only were deer apparently numerous, those hunters who sought them had developed a fairly rigid tradition. Horsemanship was a particularly prized ritual of the hunt. Note also that the scaffold mentioned is really nothing more than an elaborate deer stand, although baiting is now illegal.

As an interesting sidelight, there is a good population of deer again in Chatham County for the first time since about the mid-1800's, partly because of an intensive habitat management and restocking program by the N. C. Wildlife Resources Commission on the New Hope Game Lands. We think Mr. "H" would have been pleased.

It Is True The Deer Were Not Killed. But You See Clearly They Might Have Been."

Desirous of complying with your request, soliciting communications from sportsmen of the result of their hunting, I have waited, with no ordinary anxiety, during the catching of upwards of thirty foxes, each time hoping the next chase would afford something worthy to record in your very valuable pages, and as often being disappointed, few of that number having stood before our pack more than half an hour before being run into. I abandon, therefore, in despair, the hope of giving you the result of any entertaining fox chase; but, supposing it may not be wholly uninteresting to that portion of your readers, who are alive to the animating cry of dogs, to know the different modes of deer hunting in the different parts of our country, I send you an account of a late hunt during three days. I would here remark that in the part of the country in which I reside deer are not killed with the view wholly to venison, nor that the lucky huntsman should add to his count, but we are only emulous in superior horsemanship in heading the deer oftenest before he is run into by the dogs, or in dexterity in shooting.

The first day, the sportsmen having assembled, being all well mounted, and armed with a short barrel flint and steel gun (percussion being considered dangerous in the eager pursuit of the dogs, from explosion, by striking against trees and bushes), we rode about four miles to a drive, where all entering with the dogs, a challenge was soon given, and a cold trail pursued about a mile, when

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because it shows that success is possible. For many years, the wood duck was considered a threatened species throughout the nation. These colorful ducks are still far from numerous in the northeastern states, but the wood duck population native to the southeast has made a dramatic comeback through careful management paid for by sportsmen. It is significant that this comeback was accomplished without closing the wood duck hunting season.

Some years ago, experts thought the wood duck might be extinct by this decade. Instead, wood ducks are now our most abundant duck.

Success with deer, wood ducks, turkeys and others give us hope for the future. Professional wildlife biologists have learned a great deal, and the application of this knowledge is an effective and proven science. Research on diseases, habitat requirements, pesticides and many other factors give us steadily improved tools for insuring not only the survival, but also the prosperity of many wildlife species.

True, habitat is one of the main keys and it is an ever-changing condition that causes some wildlife species to decline while others prosper. You cannot have ideal habitat for quail and bears in the same place. And yet, with the renewed interest in providing a quality environment for both humans and wildlife, there also comes renewed hope that the future for all creatures may not be as bleak as some believe.

Nor is it inevitable that hunting for sport will become a thing of the past. Indeed, as time passes, more and more people may realize that hunters hold the key to a sound future for all wildlife. Hunting for sport (not to be confused with market hunting which has long since been outlawed) has never endangered a single wildlife species in this nation. The hunter has a vested interest in the future of wildlife, and his money and support have brought many species from the point of extinction to relative abundance in the past 50 years.

Wildlife and hunting are a rich part of North Carolina's heritage, but the future for both can be prosperous.

It has always been true that if there are no turkeys, there will be no turkey hunters. And in modern times, the converse seems true. If there are no turkey hunters, there may be no turkeys. ⬍⬍

One thing you almost always notice in old hunting photographs is that no one ever seemed to smile. Why? Were they more serious about their hunting back then? Did they have bad teeth, or were they just nervous about photographers. This rough looking crew of Blue Ridge bear hunters got their "bar" in 1910. In a few cases, the names have been passed down with the photo. These three lucky bear hunters (below) are John Wiseman, Edgar Burleson and H.A. Lorick. In 1892, this solitary hunter posed for this striking photo on the crest of Whiteside Mountain. (left)

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the whole pack went rapidly off in full cry. We now pursued, under spur, in the direction of Rocky River, for about three miles, when, to our great satisfaction, we discovered the cry to be returning in a direction a little below us. Great exertions were now made to intercept the game in his effort to gain Haw River, but all we could do was only to procure us the sight of a fine buck, at a distance, beyond the reach of our guns, bounding over the low bushes, and struggling to avoid the cry of ten couple of fine dogs, who were pressing him in a style that would have given satisfaction to Nimrod himself. The dogs soon passed us, and we were content to follow at a more moderate gait, hoping to overtake him at Haw River (a distance of about six miles), to which stream he was evidently bending his course; but on our arrival we found, to our mortification, that the pack had there overtaken him, and, as we conjectured, sunk him. The next morning we met, according to appointment, and entering a drive, near Haw River, a challenge and start were successively obtained, and each sportsman pursued the dogs a considerable distance up Haw River, where we were all brought together by the view halloo of one of our party, who, in the pursuit, discovered a buck making his way from Haw River to Deep River. On arriving at the latter stream, the pack swam over, and very soon took the track on the opposite side, and, pursuing it about five miles into the piney woods, forced the buck back again into Deep River, where, after about two hours hard running, he was shot—the whole pack close at his heels. The third morning we again met, and, after two or three ineffectual efforts, we at length succeeded in arousing a fine doe, which, after a rapid run of about two hours, was ran into by the whole pack in her attempt to gain Buckhorn Creek.

Another mode practised to kill deer with us is exemplified in the following: One of my neighbours discovered that some deer resorted to a small wheat patch, about a mile from him, and determined to kill one or more of them. He accordingly baited a place, and finding the deer regularly came thereto, he erected a scaffold, about ten feet high, in a situation most convenient to the bait and the part of the fence over which they were accustomed to jump into the field. The evening for killing the big buck, as he was called, was at length determined on, and my neighbour, on leaving his house with his old musket heavily charged, told his son that about sunset he might bring down to the baited field the horse and slide, to bring home the big buck and other deer which he might kill, that he need not wait his return, for the game was sure; not having failed to come into the field for some time. He arrived at the place without any occurrence worthy of remark, and, having seated himself advantageously on his scaffold, patiently waited the approach of the big buck.

At length the object of his long labours appeared, and, bounding over the fence, was followed by a second and a third. My neighbour was now highly elated, either of the three being within reach of his shot. Being a large fat man, weighing something like 240 lbs., he was not satisfied with less than all three; and that he might get

In the roadless eastern swamps, amphibious landings were often necessary to put the dogs on the track. These deer hounds apparently know what it's all about even if they haven't learned not to stand up in that old juniper skiff.

These photographs were furnished courtesy of the North Carolina Museum of Natural History, Department of Agriculture, and the Division of Archives and History, Department of Cultural Resources.

them all in a range, and have a full load for the slide home, with his musket to his face, ready for the bloody work of death, he took step after step to the right, with as much ease, truly, as the generality of dancing masters, of his weight and in his situation, would have done; but, in his anxiety, he forgot the scaffold had an end, over which he stepped, and down he came, scaffold and all! But, Mr. Editor, this was not the worst of it; my neighbour had his thigh broken, and the deer, by this time, discovering there was some design against them, bounded off into the forest, and left him, without even the consolation of a sight of them, under his affliction. The family at home were all equally sanguine that the big buck was doomed to death, and the son, at the appointed hour, repaired to the wrecked scaffold, under which the father lay, and, cautiously approaching it, repeatedly inquired of the father, "Where was the deer? I have brought the slide."

"Don't talk of deer to me!" vociferated the father, writhing under pain, "put me into the slide, if you can"; so the son assisted the father to get into the slide, and Dobbin was made to draw slowly home. On ascending the hill, near the house, the wife and children all ran to meet the big buck, as they supposed, exclaiming, "Daddy's got the big buck; daddy's got the big buck!—see how hard Dobbin pulls!" But lo, Mr. Editor, you must imagine their disappointment, when, instead of the big buck, my neighbour was in the slide. The inquiries of the children after the big buck was only put an end to by the exclamation of the father, "Don't talk of the big buck to me!"—Now, Mr. Editor, it is true the deer were not killed this time, but you see clearly they might have been

H.*

**American Turf Register*, II, 86-88 (Oct., 1830).

Part III

A Collector's Guide To:

DECOYS AND THEIR MAKERS

BY JAMES S. LEWIS, JR.

When making inquiries along our coast about the work of our early decoy carvers, the writer repeatedly was told that there were a great many hunters who made decoys for their own use only. When these old-timers departed for the "Happy Hunting Ground", little value was attached to their old blocks, and the decoys were either burned up, thrown away or scattered widely among other hunters.

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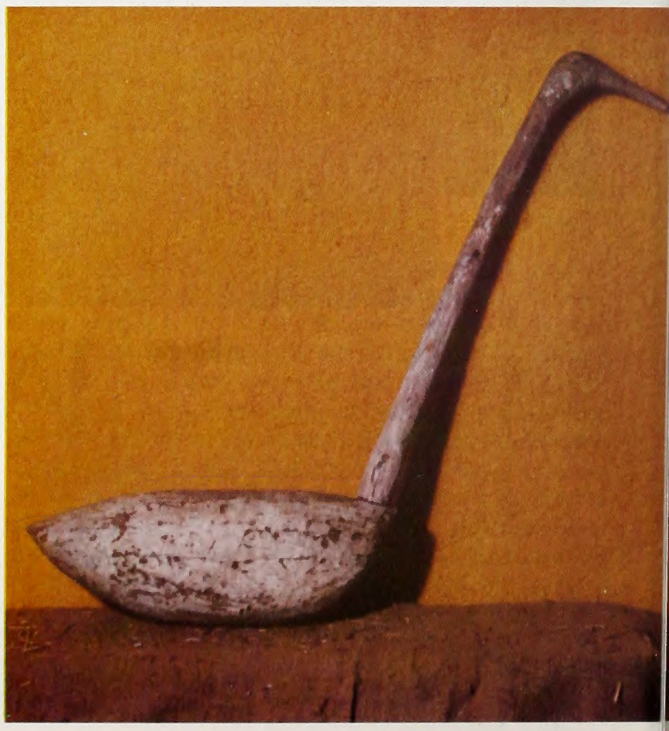
At right, clockwise from top: bluebill drake by Henry Murphy, pintail drake by Ammie Paul (from collection of Eugene Pond) and very old sleeping canvasback by Graydon Fulcher. At far right, beach robins or robin "snipes." Below, very old and rare blue heron "confidence decoys", from collection of Roy Willis. (Stick leg removed for photo)

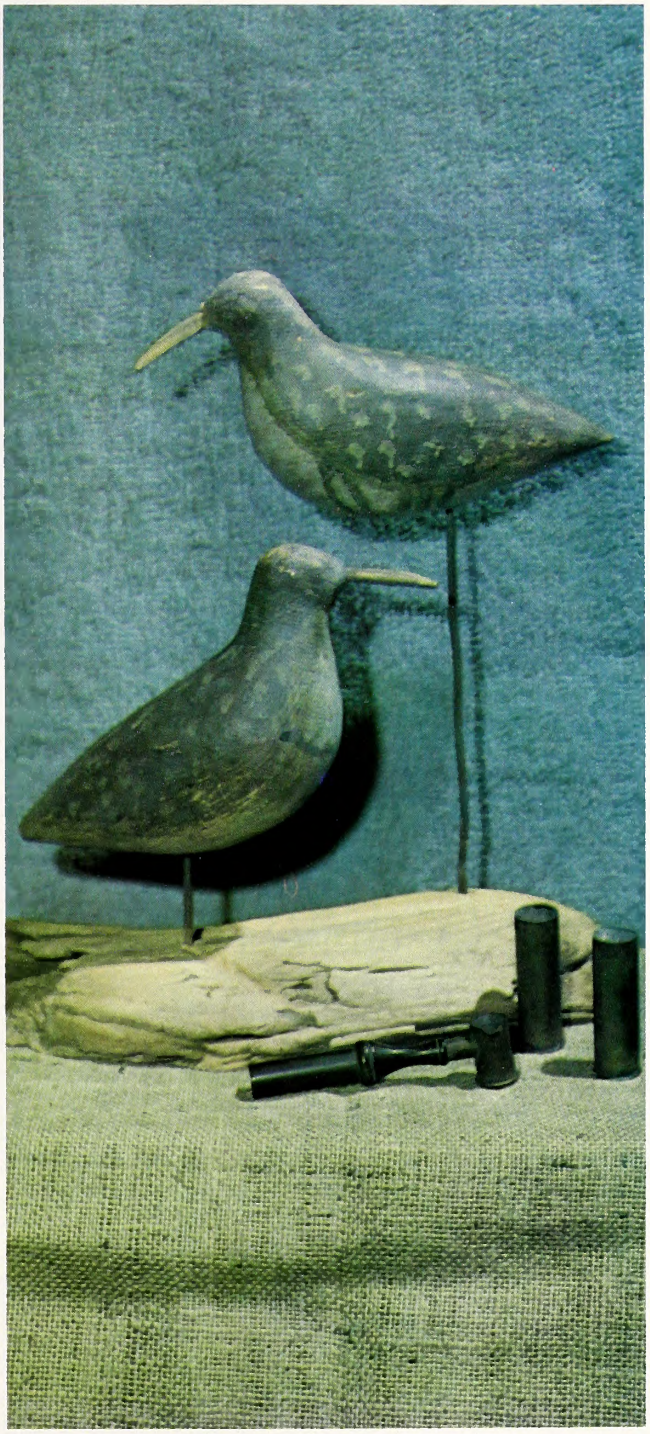
The once popular hunting area around Core Sound, which includes Atlantic, Stacy and Davis had its share of decoy makers of all categories, and Fig. 22 shows examples of work attributed to Henry Murphy, Ammie Paul and Graydon Fulcher, all three of whom were said to have made a great many decoys for other hunters. The five decoys shown in Fig. 22 are typical of those made in this area by unidentified makers. It may be seen that they tend toward smaller size and lighter construction than the battery decoys from the more northerly waters of the State.

The old weathered blue heron shown in Fig. 23 was added to the collection of Roy Willis last year when it was discovered in the wall of an old house that was being torn down. These old confidence decoys are rare indeed in our state, and the collector who acquires one has ample reason to rejoice.

Though shorebirds were hunted along our coast, and decoys for them must have been plentiful at one time, they rarely are found now. The two full-bodied "robin snipes" shown in Fig. 24, were found near Stacy.

Though this story originally was intended to cover only the State's early makers of working decoys, bridges still exist which span from "early" to "contemporary", and from "working decoys" to "ornamentals." Irving Fulcher of Stacy (now 85) was, after a lifetime devoted to it, still making working decoys in 1976, and three of his old decoys are shown in Fig. 25. Eldon Willis, also of Stacy, continues with occasional help from his son Roy, to make working decoys, many of which, however, are purchased by tourists. For many years, Eldon Willis and Elmer Salter (1902-1964) operated as a partnership which produced hand-carved decoys for hunters and guides. They once received (and filled) a single order for 1,000 goose decoys. Fig. 26 shows early and recent pintail drake decoys by Willis as well as a pair of early dippers (buffleheads) that were made by the partnership.





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Though there are other active, skilled carvers of ornamental waterfowl, shorebirds and songbirds in our state, I feel that it would be straying too far from the original purpose of this article to include references to their work in this story.

If any decoys of consequence were made in North Carolina south of Core Sound, the writer has been unable to obtain any evidence of it.

Besides hand-made decoys, a great many excellent factory decoys (Mason, Evans, Pratt, Dodge and Wildfowler, to name a few) were used along our coast early in the century, and are still sought by collectors. Since many of the members of the famous shooting clubs which were located along the Outer Banks were from the cities of the North, it is not strange that some of them had their own hand-carved decoys sent down. Examples of these are shown in Fig. 27. The pintail drake in this picture came from the Swan Island Club (has the name W.S. Endicott, the shoe manufacturer, stamped deeply into the bottom) and has enough of the characteristics of early decoys made around Crisfield, Md. to make it reasonably safe to attribute it to that source.

The Canada goose came from a group of obviously common origin which turned up in the vicinity of Atlantic. The intriguing story about these geese is that a man brought a horsedrawn wagon load of them from New Jersey, late in the last century, stopping along the way to offer them for sale in areas where waterfowl were hunted. Perhaps he couldn't get his price, or just wasn't able to sell all of them, but he finally disposed of what he had left to a guide on Core Sound, and presumably drove the wagon back to New Jersey. Both the duck and the goose have tack eyes.

Known hunter-carvers who worked in the vicinity of Ocracoke, Portsmouth Island and Core Sound, but whose decoys could not be obtained as illustrations for this story were Wilbur Gaskill, Leckler Lewis (fine silhouettes of ducks and geese) who hunted with Mitchel Fulcher as a youth, John Lupton, Lambert

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From "up north", used by members of hunting clubs along our coast (below). At right, early and much used pintail drake by Eldon Willis with recent unused specimen below (note consistency of head styles). Pair of dippers by partners, Eldon Willis and Elmer Salter (from collection of Roy Willis). Lower, from hunting rig of Irving Fulcher who was still carving decoys in 1976. Top one, bluebill drake, then redhead drake and early bluebill drake.

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Morris, J. W. Salter, Jodie Styron, Harvey Taylor, Charles Williams, Will Willis and Bob Willis. Unquestionably, many others could be added.

In winding up this introduction to some of the decoy makers of our coast, it is recognized that much interesting information about the numerous market hunters of the period, many of whom made their own decoys, probably could be unearthed by a diligent researcher, but time is running out. All too soon now, no oldtimer will be left to falteringly describe the market hunters and the famous shooting clubs that followed these professionals, and set their own sky-high limits. Few of the early makers signed or marked their decoys, but as in other areas noted for the artistry of certain carvers, some of our North Carolina makers had such distinct individual styles that their work still may be identified by those who have collected or studied decoys.

The Dudleys, John Williams, Ivey Stevens, Alvirah Wright, Ned Burgess and Mitchel Fulcher are examples of early carvers whose work speaks for itself. Considering the myriad market hunters, sport hunters and pot hunters, with their thousands of hand-carved decoys, who gunned from Back Bay to Harker's Island, when waterfowl were plentiful and bag limits were high or non-existent, we have a promising and interesting field which could be explored further.

In the considerable amount of literature which has been devoted to decoys, much has been made over the artistic talent (or lack thereof) possessed by those who created in this form of folk art, and it is true that each region had, among the ranks of its early decoy makers, a small proportion of true artists. However, the great majority made them with only practical considerations in mind: they had to attract waterfowl and to withstand the use and abuse of hunting. If among the decoys makers who hunted and carved along North Carolina's coast, we agree that a half dozen qualify as artists of some merit, our proportion probably compares favorably with the rest of the country ⬍⬍

Back of the Book

"A Better Squirrelbox?"

A wise, old sage, whose name escapes me right now, once attained fame by remarking "If you build a better mousetrap, the world will beat a pathway to your door." It's hard to say if this is so, but two North Carolina men should make out like bandits if the old saw holds true. Dr. Frederick Barkalow, Jr., of North Carolina State University and Robert Soots, Jr., formerly a student at NCSU, have designed a better squirrel nesting box.

The plans were recently published in an article in the Journal of Wildlife Management and the gist of the article is as follows:

First of all, artificial nesting boxes will attract squirrels into poor squirrel country and help the critters maintain an active breeding population in the area once they move in.

The box should be made of solid, one-inch cypress or pine boards and be fastened together with eight-penny, zinc-coated nails. The bottom should be made of half-inch wire mesh screening to keep predators out and will help dry the nest out in wet weather. About an inch of dry leaves should be put in the bottom of the box when it is first set out. The life of a box made of cypress is about 20 years.

In areas that are heavily used by people, boxes should be placed high enough up in the trees so they're free from human interference and vandalism. Boxes should be attached to the trunk of the tree and not nailed to the limbs. The action of a limb in the wind will tear a box apart and the growth of a limb will form a callous where the box touches it, eventually splitting the box. Placing the box within a cluster of limbs on the trunk will also provide additional protection to the animals.

Anyone wanting plans and more information on how to build a squirrel nesting box should contact Tom Sanders, Extension Wildlife Specialist, Box 5577, NCSU, Zoology Dept., Raleigh, N. C. 27607. And if you build some, don't be surprised if the world beats a path to your door.

Michigan May Be China's Last Chance

Considering the fact that the population of China is fast approaching the 1 billion level, it is with some relief that we read about proposed limits of ginseng export. The Chinese consider ginseng to be a potent aphrodisiac and we would hope that limiting exports from this nation might have some inhibitory impact upon their reproductive exuberance. If regulations proposed by the Federal Endangered Species Scientific Authority are enacted, only Michigan would be allowed to export ginseng. Michiganders hold that line!

Ginseng is a plant that grows in moist hardwood forest areas. The roots are branched and sometimes crudely resemble the human body, thus implying to ancient herbalists that its consumption contributes to human fertility. The legend spread and resulted in the extirpation of the Chinese ginseng. Now they are about to extirpate the species from the United States by paying from $60 to $100 for the dried roots here. The Endangered Species Scientific Authority is trying to save our species by limiting export to those states that have developed a program to manage and preserve it.

—Frank Barick

Congress Put Squeeze on Boaters

State boating safety programs are headed for some hard times if President Carter has his way. Under the Federal Boating Safety Act of 1971, Congress has annually appropriated $10 million to be given to State boating safety programs. The president is recommending that only $3 million be given out in fiscal 1979, and that no money be given out thereafter.

State boating divisions aren't the only folks riled by this move. The Coast Guard supports the program because federally assisted increased state law enforcement, education and boating safety promotion efforts have improved the national boating safety record.

Water Over The Dams

Back in Noah's time, it took 40 days of rain to cause a flood. Now, however, it takes only two or three days. Can the recent catastrophy be the result of flood control programs that encourage people to build homes and factories in floodplains? And easy federal money to help people rebuild in the same place, in time for the next flood?

How many more people must be drowned and homes and business places demolished before we learn to reserve floodplains for flooding? How long will it be till voters support land use planners who attempt to place such locations off limits for development and reserve them for parks and recreation? Riverside lands that are subject to flooding belong to the river and the river will claim them from time to time regardless of our best efforts. Throughout history, man-made structures have provided but temporary shelter from the elements. Placing them in the pathway of floods inevitably results in disaster.

—Frank Barick

Conservation Education Program Underway

The International Association of Fish and Wildlife Agencies, which includes all state fish and game departments, plus those of the Canadian provinces and Mexico, have banded together to start a new wildlife foundation. The program is called A.W.A.R.E.—which stands for America's Wildlife Association for Resource Education.

The Foundation plans to show the public the sportsman's place in wildlife conservation. For starters, the Foundation is producing a TV show called "American Wildlife." The film lasts a half-hour, is a documentary, and is telling the story of fishery and wildlife management from a professional's viewpoint. The Foundation is also planning to produce a series of 13 shows on this subject scheduled to be aired in 1978.

The A.W.A.R.E. program has also received support and financial backing from the Archery Manufacturer's Association, the Fred Bear Sports Club, and the National Rifle Association. These three organizations recently produced a 26-week series of shows entitled "America's Outdoors" which carried AWARE fund raising spot announcements.

Anyone wishing to support the AWARE program should write to A.W.A.R.E. PO Box 2594, Washington, D. C. 20013 for additional information.

Is Everybody Happy?

The Colorado Division of Wildlife recently did an interesting study, as studies go, on what makes hunters happy. Never having given this much thought, I felt you might be interested in what they came up with.

First of all, the study broke down the index of pleasure into several categories. The first was highly detracts from the hunting experience, then moderately detracts, then neither adds nor detracts, moderately adds and highly adds.

Not surprisingly, the category of nature topped the list with 94 percent of the hunters checking it in the highly adds category. Escapism ran a close second and skill followed third.

Next on the list was companionship, which had a few responses in the moderately adds category and almost none in the highly adds category. I find this surprising; companionship is one of the things I value most in the field. Either Colorado hunters are exceptionally unfriendly, which I doubt, or they only go hunting with people they don't like.

The two categories following, with almost identical scores, were shooting and the harvest. These ran mostly in the neither adds nor detracts category, and in the moderately adds category, with very few responses in the highly adds category. This very effectively kills the anti-hunters contention that we're all a bunch of blood-thirsty brutes. Between hunters, there were varying responses, mostly due to the nature of the sport. Pheasant and waterfowl hunters put a higher priority on shooting and getting their quarry than elk hunters do, but elk hunters don't expect to do much shooting in the season anyway.

The next category was vicariousness. For the one or two of you who don't understand what that means, I'll stop and explain. These are activities relating to the sport usually done in the off-season—like watching TV shows or reading stories about hunting. This ranked fairly low, with deer hunters enjoying it more than any other type of hunters. The hearts of outdoor writers and editors everywhere go out to you deer hunters.

The lowest items on the list were visual and verbal contact with other hunters. These both moderately to highly detract from the hunting experience. That's no surprise to me. Who likes to run into some other slob in their "secret spot"?

Pesticides May Solve Population Problems

The recently announced finding that factory laborers handling an agricultural chemical called DBCP had abnormally low sperm counts, suggested to some that this offers a new route to population control. Considering the tremendous variety of pesticides already on the market, (not to mention other chemicals contaminating our food and environment) and the presently reduced birth rate, one cannot help but wonder if there is a connection somewhere.

Even the breast milk of vegetarian mothers is contaminated with PCB and pesticides. According to tests conducted by the Environmental Defense Fund, they are somewhat less contaminated than those who consume meat. Since most foodstock animals are largely vegetarian, subsisting on pesticide contaminated foods, they concentrate pesticides and PCB so that meat eaters get a heavier dose of pesticides than non-meat eaters.

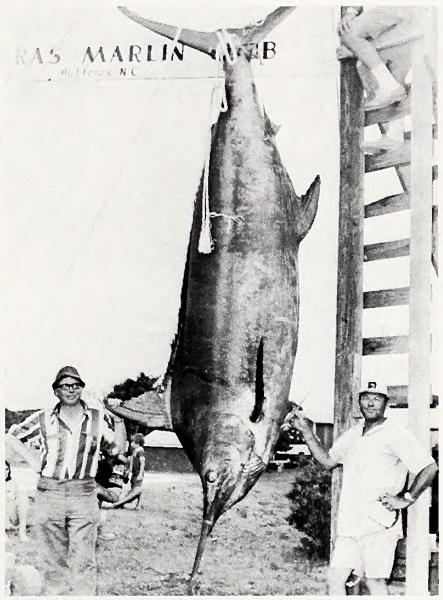
—Frank Barick

This photo recently came into the Commission office from Charles Rucker of Greensboro. It is a band taken from the leg of a Canada goose, shot by his father on Currituck Sound in 1941. Mr. Rucker's question is: does anyone know if the Biblical inscription has any special significance for goose hunters? If anyone knows, drop a letter to "Back of the Book Section," we'd like to hear the answer and share it with our readers.

Tarheels Topped By Texan World's Record Falls!

North Carolina can no longer claim the world's record Blue Marlin, according to a recent report in the *Charlotte Observer*. The Tar Heel State has held the record since 1974, when a Pennsylvanian named Jack Herrington caught a 1,142 pound fish off Cape Hatteras. The new record fish was taken by a Texan named Larry Martin off St. Thomas in the Virgin Islands, and weighed 1,282 pounds, breaking the old record by 140 pounds. Both fish, in a sense, were flukes. When Herrington caught his fish, he was on a "pick-up" charter, and had never trolled for billfish before. Martin's catch was just as unlikely, he had just got a job as a mate on a boat, and was out fishing to get a bit of experience.

The largest Blue Marlin ever caught was taken off Hawaii in 1970, it weighed 1,805 pounds and took three anglers to bring to gaff, disqualifying it as a world's record. Originally, marine biologists believed that Pacific Blue Marlin grew larger than Atlantic fish and doubted that a Blue Marlin over 1,000 pounds would ever come out of the Atlantic, but in recent years they've been forced to eat crow by a few lucky anglers.



North Carolina's world's record blue marlin, shown here, was recently beat out by a new catch off St. Thomas in the Virgin Islands. The old record was held by Jack Herrington, who caught the 1,142 pound fish off Cape Hatteras in 1974. Larry Martin, the Texan who broke the record, had never caught a marlin before but being's he'd recently landed a job as mate on a charter boat, figured he'd better pick up a little "hand's on" experience. Offhand, it sounds like he had a "hand's full" experience. (Photo by Acock Brown)

Hypothermia—Winter's Big Killer

Sportsmen who plan to use their boats in the fall or winter should bear in mind a few grim statistics when doing so.

According to the Mercury Marine Company, although only 10 percent of the boating accidents logged involve sportsmen, the outdoor fraternity accounts for 43 percent of the fatalities.

This is not to say don't use your boat in the fall or winter. Just be aware of the dangers. Perhaps the chief danger is hypothermia, which is death due to cold, but a few simple steps can drastically increase a person's chance of survival should they go in the drink. For starters, you should always wear a hat on the water. In the event of a capsize, over 50 percent of the bodies' heat is lost through the head and a hat can cut this heat loss considerably. Warm woolen jackets also help hold the heat in, and a personal flotation device is a must. Any energy spent staying afloat is that much less time spent alive, and many of the new flotation jackets provide excellent flotation and insulation and are less bulky than traditional life jackets.

In addition, bone up on the first aid rules for treating hypothermia victims before going out. And above all, never resort to the old remedy of giving an exposure victim a slug of alcohol, it will kill them just that much quicker.

What Was Used For Bait?

A Colorado man recently found out that poaching doesn't pay. He'd shot four Canada geese out of season when he sighted a Colorado conservation officer's truck headed his way. He ditched the geese in a culvert, and crawled into another close by.

The two conservation officers searched the area, and found nothing. One of the men went to the truck, got his fishing rod and cast into the culvert. He snagged a goose, and in a few minutes, had the four of them in hand. The other officer got his rod out too, and cast into another culvert. He pulled out a shoe, which was attached to a kicking, cursing poacher.

The man was fined $225.

Enforcement October Report

North Carolina Wildlife Enforcement Officers checked a total of 30,232 hunters and fishermen in October, 1977. Of these, there were 861 prosecutions and 778 convictions. Total fines collected tallied up to $4,265 and total costs collected added up to $18,542.

A total of 19,802 boaters were also checked. Of these, there were 955 prosecutions and 849 convictions. Total fines collected were $1,513 and total costs collected were $20,235.

Sportsmen Pay The Tab

How many sportsmen are there in the U. S.? According to the Department of the Interior's Fish and Wildlife Service, 60 million sportsmen bought hunting and fishing licenses in 1976 from state agencies. The total tab amounted to about $318 million, much of it used for wildlife restoration. This works out to about one in five Americans buying a hunting or fishing license, making outdoor sports the most popular participant sports in America.

WILDLIFE IN NORTH CAROLINA

The fact that you're reading this magazine indicates a wide variety of things all the way from "you've nothing better to do while waiting for the dentist to gently remove a tooth," to "an absorbing interest in North Carolina's wildlife and its welfare." After some 17 years' association with WILDLIFE IN NORTH CAROLINA as Managing Editor and Editor, I know that you, our readers, do have a tremendous range of outdoor interests.

We know that the magazine and its staff have the rather awesome responsibility of presenting information which is aimed at the successful management of North Carolina's wide variety of wildlife. We have the task of informing our readers about our State's fragile endangered species as well as the fine sports of hunting, fishing, trapping and boating. And much, much more.

Perhaps "something for everybody" is an impossible goal, but it's an end towards which we will continue to strive. We feel that you, our readers, want more than entertainment, "pretty pictures," and flashy color. It continues to be our aim to provide you with information and material that you can use in helping us further the cause of wildlife and all of our natural resources.

You will see some changes in WILDLIFE IN NORTH CAROLINA in this issue and in the future and we hope that these will be meaningful changes which will make the publication more useful, more attractive, easier to read, and simply a "better" magazine. There will be a feature article each month, perhaps something with a bit more depth than much of the other material. We hope to use more and larger color photography and artwork, along with more attractive design and layout. You'll find "Resource-O-Gram" incorporated into the "Back of the Book" section, along with "Environmental Briefs," "Stem to Stern" and significant bits of information. "Natural Heritage" will feature a person, place or event from the past and bring it into focus. "Nature's Ways" will highlight a facet of the fascinating world of nature.

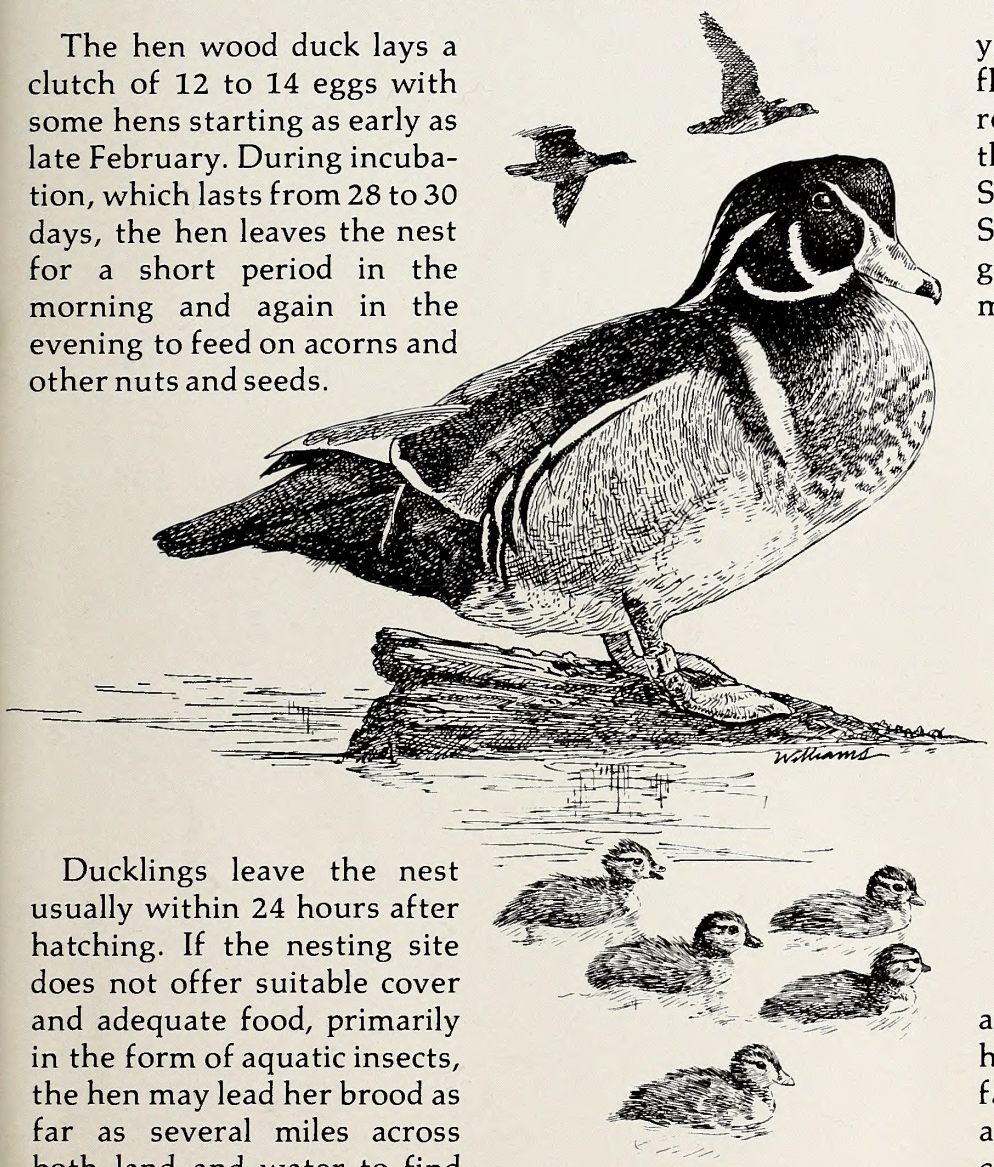
But with all the changes we're planning for WILDLIFE IN NORTH CAROLINA, it must remain just that, "wildlife in North Carolina." Unless it speaks to the issues confronting our wildlife, unless it makes a difference in the wise use of our natural resources, unless it helps you enjoy the sports of hunting, fishing, trapping and boating, then all the carefully chosen words, the precise layout and quality printing aren't doing the job.

We continue to welcome your input on how you feel the magazine can better serve you and our State's wildlife. We want it to make a difference.

Duane Raver, Editor

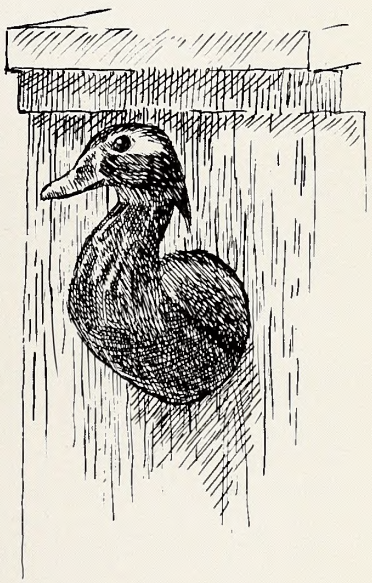
The Wood Duck

The hen wood duck lays a clutch of 12 to 14 eggs with some hens starting as early as late February. During incubation, which lasts from 28 to 30 days, the hen leaves the nest for a short period in the morning and again in the evening to feed on acorns and other nuts and seeds.



Ducklings leave the nest usually within 24 hours after hatching. If the nesting site does not offer suitable cover and adequate food, primarily in the form of aquatic insects, the hen may lead her brood as far as several miles across both land and water to find good brood-rearing habitat.

As summer progresses the young birds become strong fliers and, by October, are ready to begin migrating to the warmer climates of the South Atlantic and Gulf States. It is on the wintering grounds that the birds pair for mating.



In early spring, the drake accompanies the hen back to her native area. Some hens, in fact, return to the same pond and even the same nesting cavities or nest box year after year.

The wood duck's story is fascinating, not only from the standpoint of the bird's life cycle, but also because it represents a major achievement for American conservationists.

In the early part of this century, a prime, full-plumaged male wood duck skin would bring from $3 to $4 for use in making artificial fishing flies and ladies hats. Overharvest in pursuit of both feathers and meat reduced wood duck population numbers to such a low level that in 1918 sportsmen were able to close the hunting season on this bird. The season stayed closed until 1941 when hunters in a few states were once again allowed to take one bird per day. Due to closely regulated harvest and the success of artificial nest box programs, which are in part able to compensate for the continuing loss of nest sites and habitat, the wood duck has now become so numerous in our State that it is the most frequently harvested of all of our waterfowl species. The Wildlife Resources Commission currently bands hundreds of wood ducks each year in an effort to find out more about their biology.

Cardinals

Courtesy Dr. Charles W. Lomax

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WILDLIFE IN NORTH CAROLINA

FEBRUARY 1978

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Our Natural Heritage

THE YEARS THE FLOODS CAME

In 1916, a hurricane dumped a record 22 inches of rain at Altapass, and the swollen French Broad River swept through Asheville destroying bridges, homes, shops and a railroad yard where dozens of steam locomotives were virtually submerged.

The small tombstone is easily overlooked at the fork in the trail alongside Basin Creek. Still, a passing fisherman or hiker will occasionally notice the small stone tucked back in the undergrowth and read the epitaph to the 16-year-old girl who drowned in 1916.

One life. A small and poignant memorial, all but forgotten. And yet, there are similar tragic reminders scattered throughout North Carolina, especially in the foothills and mountains.

Two dates — 1916 and 1940 — are permanently etched into the natural history of this state, and one needn't be an oldtimer to know about them. Yet, for those who witnessed them, all time dates before or after the massive floods that occurred in mid-July, 1916 and again in August in 1940. All other floods, even significant ones in 1928, and again this past fall, pale beside those two big ones, both spawned by hurricanes.

Accounts of the 1916 flood seem incredible. A hurricane advanced across South Carolina and stalled against the Blue Ridge. Over 22 inches of rain fell at Altapass, and amounts from 10 to 20 inches were not unusual throughout the area. Streams, already bankfull from a tropical storm earlier that month, went on a rampage.

While damage was widespread, the French Broad and Swannanoa rivers were among those hardest hit. On July 16, 1916, the French Broad crested at 27.2 feet at Blantyre. At Asheville, where flood stage was only four feet, the river rose to 18.6 feet before the gauge was swept away. Certainly the actual crest was much higher there.

Flood waters reached the second stories of some buildings. Railroads were washed away. Bridges collapsed. There were massive mud and rock slides. Whole valleys were swept clean, and the muddy currents carried away the hopes, dreams and lives of many.

The 1940 flood, while it did not crest as high as the 1916 flood in most places, has also left a tragic legacy. Actually, there were two 1940 floods — one on August 13 and another on August 30. Both were severe and the first crested at 21.88 feet at Blantyre. Two weeks later, it crested again at 19.31 feet. Devastation followed the first flood. The second found little left to destroy.

There is an old photograph of a town named Mortimer north of Lenoir on Wilson Creek — a bustling town with several hundred people, a large band mill, a textile mill, a railroad line and a future.

The 1940 flood took care of that. All that is left of Mortimer now is a crumbling old hotel, the walls of the old mill and piles of boards from a few of the houses which escaped the wall of water that thundered down that valley. After the 1916 flood and the 1940 flood, people gave up on Mortimer and many other towns like it throughout the mountains.

Many areas, like Mortimer, went into the National Forests or into various other public holdings such as parks, and no doubt the floods influenced this. Ironically, in this way, some of the wilderness and near wilderness areas of western North Carolina were saved, but at a steep and grisly price.

Why were there such massive floods? Was it because of the hugh private timber operations which kept the land from absorbing and slowing down the water, thus reducing the damage? Undoubtedly, this played a part, but there were other massive floods before these — one as early as 1791.

Western North Carolina has recently experienced another flood in 1977, one that caused considerable damage in 16 western counties. But as bad as it was, it could have been worse. Our western forests, especially those on public lands, are no longer subject to massive clearcuts. Small clearcuts, which are not conducive to flooding, are now used not only to slow runoff, but also to protect habitat for fish and game. Flood plains are still being developed, but there is a new awareness of the dangers.

We've learned some lessons, perhaps, but one still has to wonder what it would be like to have 22 inches of rain again fall in our state. The flood plains, like everything else, belong to God, and He reminds us of this from time to time.

By Jim Dean

WILDLIFE IN NORTH CAROLINA

The official publication of the North Carolina Wildlife Resources Commission, Raleigh 27611. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

Volume 42, No. 2 *February, 1978*

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OUR STATE PARKS IN WINTER

Marcia Constantino

Explore Nature's Mysteries While The Woods Are Quiet And The Crowds Are Gone

The first breath of spring each year brings thousands of Tar Heels out of their homes and into state parks and recreation areas across North Carolina. The first hint of winter drives them all back indoors to "hibernate," leaving the parks peopled only by rangers and a few hardy outdoors types.

Parks do not have to become deserted when it's cold say the park superintendents in North Carolina's 30-plus state parks. And to prove that winter in the parks can be fun, Eno River State Park near Durham sponsored a Sunday special event last fall based on the theme, "Don't Hibernate—Do It In Winter".

Dan Watkins

Experts on winter hiking, camping, and canoeing demonstrated their skills and instructed visitors on how to prepare and equip themselves for outdoor comfort and safety in cold weather. Winter birding and wildlife observation, brewing herbal teas, and first aid were other topics covered during the session.

Visitors agreed that even without the popular summertime activities of swimming and boating, state parks offer many opportunities for a variety of winter activities.

Two activities, hiking and nature study, can be enjoyed in almost every state park. Rangers in most parks will conduct interpretive nature walks on request.

Although the absence of blossoms and leaves makes plant identification difficult for the average person, the park visitor can observe how plants adapt to cold weather conditions. And wildlife is easier to spot on a landscape not screened by dense foliage. Visitors can look for other signs of animal life such as squirrel cuttings, tracks, and the winter homes of hibernating animals.

A few parks have self-guiding nature trails with descriptive markers. Nature trails at Pilot Mountain State Park north of Winston-Salem and at William B. Umstead State Park near Raleigh are keyed to descriptive booklets available at the park offices. Stations on interpretive trails at Carolina Beach State Park and Fort Macon State Park and Theodore Roosevelt Natural Area near Atlantic Beach carry the information on wooden markers.

Year-round interpretive programs are operated at two state parks—Fort Macon and Weymouth Woods Sandhills Natural Area in Southern Pines. Tours of the 150-year old fort are conducted by the park historian at 11:00 a.m., 1:00 p.m., and 3:00 p.m. daily. Bird walks at 9:00 a.m. on Fridays and nature walks at 9:00 a.m. on Saturdays are led by park staff throughout the year. Visitors can observe winter marsh and shore birds and learn about the edible and medicinal plants of the beach area.

The nature museum at Weymouth Woods features subterranean life through a beaver pond and a "sounds of the night" exhibit. Other displays tell the saga of early man in the Sandhills, the story of the long leaf pine, and the history of the turpentine industry which once flourished in the area.

Winter bird life is varied and distinct in parks throughout the state. Cardinal, blue jay, nuthatches, and purple finch can be seen in most parks. The junco, or "snowbird" of the mountains extends its territory to the Piedmont in winter. Several kinds of migrating winter waterfowl stop over to rest and feed on state park rivers and lakes. Each year hundreds of wild ducks find their way to Merchant's Millpond State Park in Gates County and to Lake Phelps at Pettigrew State Park near Creswell. Mallards, black ducks, ring-necked ducks, red heads, and whistling swans can be seen in the marshy areas near the millpond. Lake Phelps at Pettigrew is a stopover for 2,000 to

Hugh Morton

5,000 Canada geese, and a permanent nesting area for wood ducks. Many winter migrating waterfowl such as whistling swans and Canada Geese can also be seen at Umstead State Park and Kerr Lake State Recreation Area.

Canoeing is available all year at Merchant's Millpond, Eno River, and Raven Rock State Parks. The Eno River is highest in winter, and river users can obtain depth readings and directions on canoe access by calling the park office.

At Merchant's Millpond, park personnel conduct interpretive day and overnight canoe trips for organized groups by advance arrangement with the park superintendent. The canoe trip from the millpond goes down Bennets Creek, currently under study by the North Carolina Natural and Scenic River System.

The Cape Fear River flowing through Raven Rock State Park near Lillington attracts numerous canoeists. A canoe camp with five sites and a group wilderness camp that can accommodate up to 200 people are located in low-lying pasture areas along the river. Information on canoe launching and take-out areas can be obtained from the park office.

Family campgrounds are open all year at many parks, weather permitting. At other parks, camping is primitive. In the western part of the state Pilot Mountain and Hanging Rock State Parks are open to winter campers. Morrow Mountain State Park near Albemarle, William B. Umstead State Park, and Kerr Lake Recreation Area near Henderson offer winter camping in the Piedmont. At Kerr Lake, Hibernia, Satterwhite Point, and Nutbush Bridge parks are open. Campsite water facilities here are turned off from December through March, but drinking water is available from pumphouses in camping areas. Coastal Plain state parks with winter camping include Carolina Beach State Park, Pettigrew State Park, and Cliffs of the Neuse State Park near Goldsboro.

Campers are advised to check with park superintendents in advance to learn what facilities are open during the winter months. Camping in state parks is by permit from the park office, and a fee is charged.

Lakes, ponds, rivers, and streams in many state parks are open for fishing all year. Information on species found in park waters, catch limits, and fishing rules and regulations can be obtained from the park superintendents.

Only one park, Mount Jefferson near Jefferson, is regularly closed to visitation during the winter months. Mount Mitchell on the Blue Ridge Parkway closes when heavy snowfalls make park use impossible. Hammocks Beach, the island state park near Swansboro, is accessible only by private boat during late fall, winter, and early spring when the free passenger ferry service is not in operation. Visitors must have prior approval from the park office before going to the island.

For more information on wintertime activities in state parks, write the N.C. Division of State Parks and Recreation, Department of Natural Resources and Community Development, P.O. Box 27687, Raleigh, N.C. 26611.

Marcia Constantino is a writer for the Public Affairs Section of the Department of Natural Resources And Community Development.

Bob Gooch

The bobwhite quail has changed his habits over the years, but he's still our favorite upland gamebird.

Gentlemen Of The Thickets

The spring weather in this region tends to be on the wet side and can cause loss of nests and broods. April showers are prevalent even in May, and the summers are hot and humid. Humans often object to this kind of climate, but as long as springs are not too wet and cold the bobwhite finds it near ideal. The autumns are cool and dry, and this too favors the popular bird.

The bobwhite is not a wilderness bird, though it can adapt to near wilderness habitat. There were apparently quail in North Carolina and other southeastern states even during the days of the Indians. They lived near clearings in the forests, along the weedy river bottoms, and were attracted to the somewhat crude farms of the Indians.

It was the white man, however, clearing away the forests and tilling the new fields, who provided the heyday of bobwhite quail hunting in the Southeast. As the forests disappeared the family farm became the way of life in rural America, and the bobwhite found this life near perfect. This was the golden era of quail hunting in America. The family farm was the basic agricultural unit right up to World War II. Since then commercial farming and intensive land use practices have drastically reduced the quail's habitat.

There are still family farms in eastern North Carolina. Bill, Jim and I hunted several that late February day. Those families cling to a cherished way of life. Today there is a quiet movement back to the land. The bobwhite may have endured to enjoy a limited return to the old ways.

The modern quail hunter is indeed fortunate when he can find a family farm and get permission to hunt it. It is a privilege he should value highly.

There are too few family farms to support many bird hunters, however. Today, most hunters must look elsewhere for their birds.

Commercial farms are a possibility, certainly a much better one than a wilderness environment. We found birds on commercial farms that February day — in the corners of the big bean fields where the large harvesting machines could not navigate, in the rough edges, along the swampy ditches, and in the rough cover that surrounded most fields.

You work for your birds in such cover, walking many miles and risking lacerated legs and hands in the briers and brush. Durable brush trousers are a must.

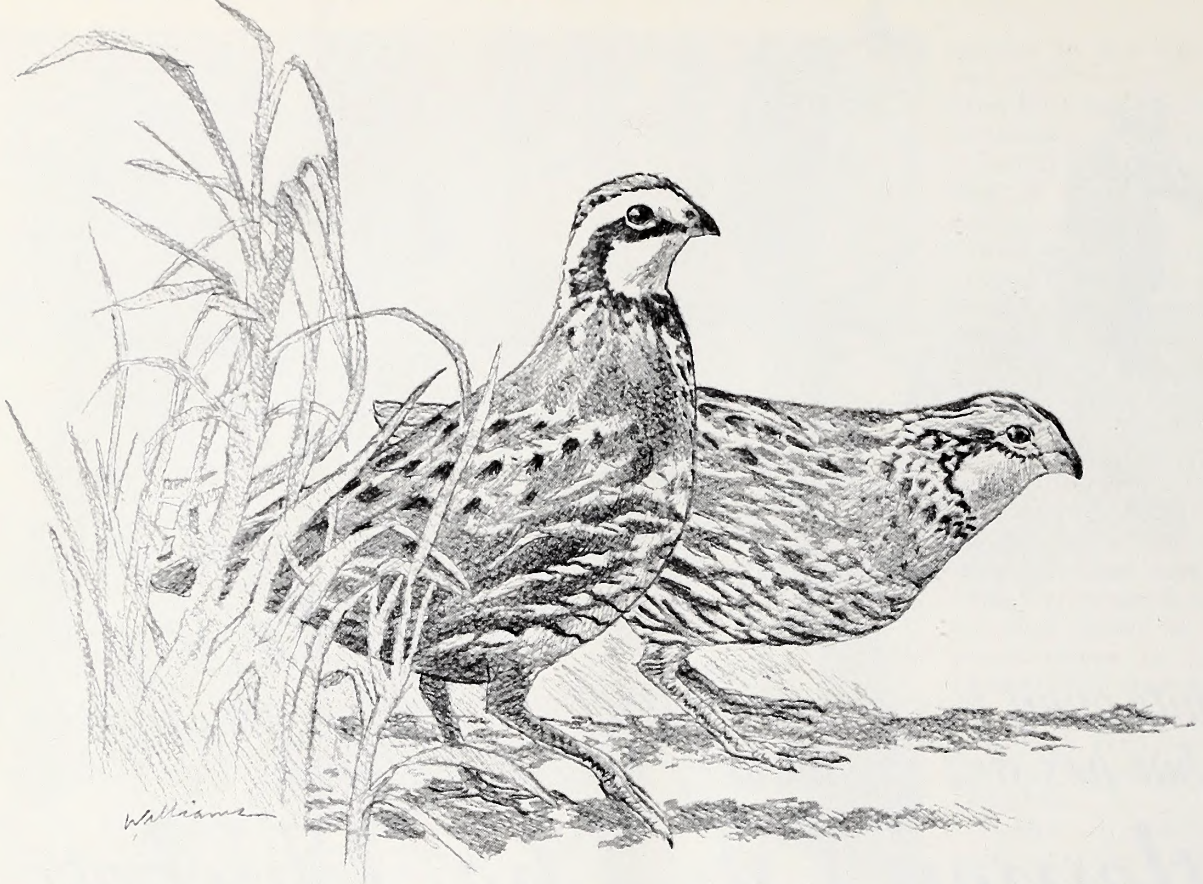
Cut-over forests hold quail today also, particularly during the first few seasons after the loggers have done their work. Eventually the young trees take over, but in the interim weeds, berries, and briers have their day — and the birds love them.

Once this early stage in the evolution of a forest has ended the hunter should seek another cut-over forest. Quail biologists say a young pine plantation offers good hunting during the first five years.

There are other odds and ends of clearings or partial clearings that provide bird hunting. Try the utility right-of-ways, the little used back roads, abandoned farms, old sawmill sites, and other neglected lands.

Many North Carolina Game Lands hold quail. The booklet, *1977-78 Hunting and Fishing Maps for North Carolina Game Lands,* lists 39 Game Lands where quail are one of the primary species. Many of these are in the eastern part of the state.

There is not a county in North Carolina that does not have some quail, and often the best hunting is on private lands. The hunter who conducts himself as a sportsman and is courteous in his approach can



usually find some good private lands to hunt.

The modern bobwhite lives by his wits, accepts a wide variety of foods, and adjusts to a changing environment. It is a wild bird, a true challenge to the best wingshot.

Once a covey has been shot into a couple of times, it offers few good covey shots. Quail adjust to hunting pressure by flushing wild — usually long before the hunter can get within range. Many wild coveys do not even hold for dogs, a frustration for both hunter and dog. Good covey shooting is fairly common early in the season, but less frequent as the season progresses.

The modern bird hunter is of necessity mostly a singles hunter. Most hunters also find it easier to hit a single bird than it is to pick one from a covey. Covey rises baffle many hunters.

Shooting into the covey is rarely effective though good wingshots often wait for the birds to bunch up and try to take several with one shot. The average hunter can handle a lone bird much better than he can a covey, however.

While the flushed birds will scatter, most will alight in the same general area. The hunter may flush two or three together, but he is just as likely to jump a single bird.

Alone and alert, the single bird tends to sit tightly, often refusing to flush until practically stepped upon. For this reason, the single birds provide the best conditions for good dog work. They hold well for the dog and let the hunter get within effective range.

A flushed bird, air washed from the fast flight, and sitting tightly with its wings clamped to its body does not put out much scent for a dog to work on, however. Dogs with the strongest noses usually excel. The fast, wide-ranging covey dog is seldom a top singles dog though I once owned a wise old setter that was good at both.

Some of the new breeds such as the German short-haired pointer are good. They have strong noses and are thorough-hunting plodders. I own one that seldom finds a covey, but he is tops on singles and locating dead birds.

Still, the English setter is my sentimental favorite. There is a four-month old pup in my kennel now. He is friendly and lovable and growing into a handsome dog. I have never known a bad setter. Maybe I too cling to a way of life — just as do those family farmers. Basically though the setter is a fine bird dog.

In guns I lean toward the old side-by-side double. It too is part of my bird-hunting heritage.

Lightweight automatics are more popular today, and they are certainly fine shotguns. The bird hunter's gun should be light so that it will swing easily with a fast moving target. The gun that mounts quickly and swings fast will take more birds, even though it may possess less fire power.

Most quail hunters shoot size 8 field loads, though some prefer sizes 7½ or 9 for special situations.

A final word about those singles.

The flushed birds will head for the nearest cover, seeking an opening in the forest canopy through which to put down. Look for them along woods roads, in cut-over areas, and along streams.

Once you have them located generally, a close-working singles dog will pinpoint them for you, and a light, fast-swinging scatter-gun will put a few in your game pocket.

That's quail hunting as I know it today and as it is likely to be in the foreseeable future.

Bob Gooch is a free-lance writer, photographer and lecturer on outdoor subjects. He is the author of many books, and is a regular contributor to national outdoor magazines. Bob hails from Troy, Va.

Ken Taylor

Gun Dogs!

A Hunter And His Dog Share A Common Bond Enriched By Many Hours In The Field. Here Are Some Of North Carolina's Favorite Breeds.

by Dave Duffey

Few things hang on longer than hunting traditions and outdoorsmen are most comfortable with what's familiar. Since men and dogs have long shared time in the field and by the fire in the North Carolina tradition, it follows that most Tarheel sportsmen are familiar to one degree or another with the hounds and bird dogs that have proven their mettle on both large and small game.

But even the droves of North Carolina hunters who have owned, trained and hunted with the Pointers, Setters and Foxhounds of their forefathers may have a less than passing acquaintance with numerous "strange" breeds of gun dogs that would suit most any man who goes afield in terms of both added enjoyment and practical results.

In certain situations, one breed or type of dog can be depended upon to do the job better than others. But no particular kind of dog has a mortal lock on doing it right and it's worthwhile for each hunter to settle on the type that best fits his general pattern of hunting.

Take the quail hunt I enjoyed with Snooky Scott, who trains bird dogs out of Tillery in Halifax County, shortly after I moved to Eastern North Carolina. I had a couple of Pointers I wasn't exactly ashamed of; particularly Stupido, who has done the job for me from Montana to North Carolina and parts inbetween.

At the start I was right proud of my dogs and tolerant of Snooky's. Stupido in particular rimmed the big beanfields, easy gaited, high-headed with tail cracking. We had eight coveys pointed and when Stu showed on birds it was with the style and intensity that frost a bird hunter's cake. He suits me.

But for all that, the morning proved mighty embarrassing. Nothing gravels a bird dog man more than to have his best dog outbirded by another. But that's what happened to Stu and me. Every one of those eight coveys was back in the woods dividing the fields from the swamp on Alex McLennan's Ventosa Plantation near Scotland Neck. Stupido's sole contribution to the morning was a series of stylish backs when he returned from some nice, long cast to

find one or both of Snooky's dogs standing a covey back in the oak, honeysuckle and briar tangles.

I can come up with as many "reasonable explanations," or excuses, as the next hunter. A knowledgeable hunter like Snooky and good dogs are going to find more game in familiar haunts than any man and dog in strange surroundings. At another time of day . . . maybe . . . or if birds were out feeding rather than buried in the thickets . . . and so on and so on . . . the situation might have been reversed.

More importantly, however, was the thought that I was shooting birds over a brace of very effective "li'l ol' country-broke bird dogs", possessed of no distinguished ancestors, who were really doing the job right, hunting close in thick cover and finding birds. Cut it any way you choose, the name of the game is bird hunting and it's at its best when a covey rises in front of a stanch dog's nose.

Where had I enjoyed comparable work? Strange as it may seem, in the grouse woods and woodcock alleys of the upper midwest. Only the dogs doing it there were most often Brittany Spaniels, German Shorthaired Pointers, some carefully selected English Setters, or even English Springer Spaniels and Labrador Retrievers that flushed their birds within gun range rather than pointing it. With their reputation for "runnin' too big," Pointers were a rarity.

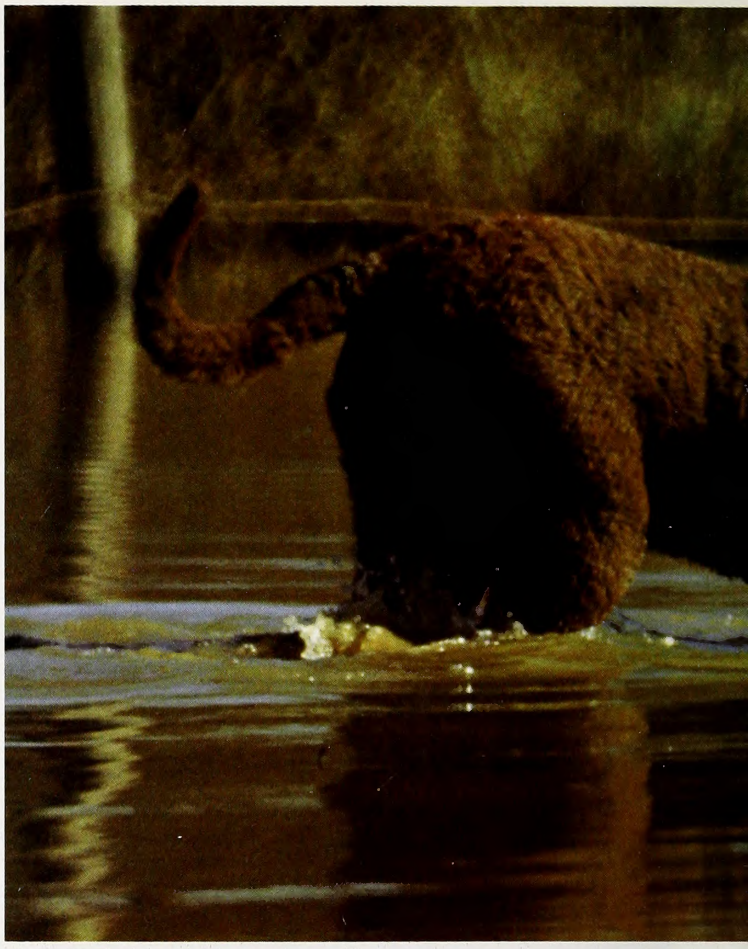
But Snooky's two Pointers would be deadly on ruffed grouse and might convince Yankee-land hunters that, with proper selection and training, Pointers can also be good close, cover dogs. Conversely, were southern bird hunters who complain that "quail birds just ain't acting like quail ought to no more" acquainted with some of the gun dogs favored in the north they might find them adjusting more easily to dense cover situations and requiring less training because their natural range is restricted rather than wide-going.

So let's discuss huntin' dogs, some of them strange to North Carolina gunners. Even a brief introduction should help hunters make up their minds whether to stick with the tried and true or whether it might be worthwhile to check out something different.

Keep in mind, however, that there will always be specific exceptions to general breed characteristics cited and the sum total of a hunting dog's capabilities depend upon the training given and the hunting opportunities offered as well as the natural instincts inherited from a long line of finders, fetchers and trailers of small and big game.

It can be said that there are four hunting dog classifications with which North Carolina sportsmen are, or should be, familiar: pointing, retrieving, flushing and trailing dogs. There is considerable overlap (some dogs that point birds also fetch them, those that retrieve may also flush them, etc.) but those are convenient designations.

Trailing dogs include all Hounds. Envisioning a pointing dog, most Carolinians see a Pointer, English Setter or perhaps even a Dropper (crossbred Pointer and Setter). But there are others. Spaniels, which comprise the flushing dog category, are uncommon dogs in the Carolinas and Retrievers, particularly Labradors, are just coming into their own among southern duck shooters.



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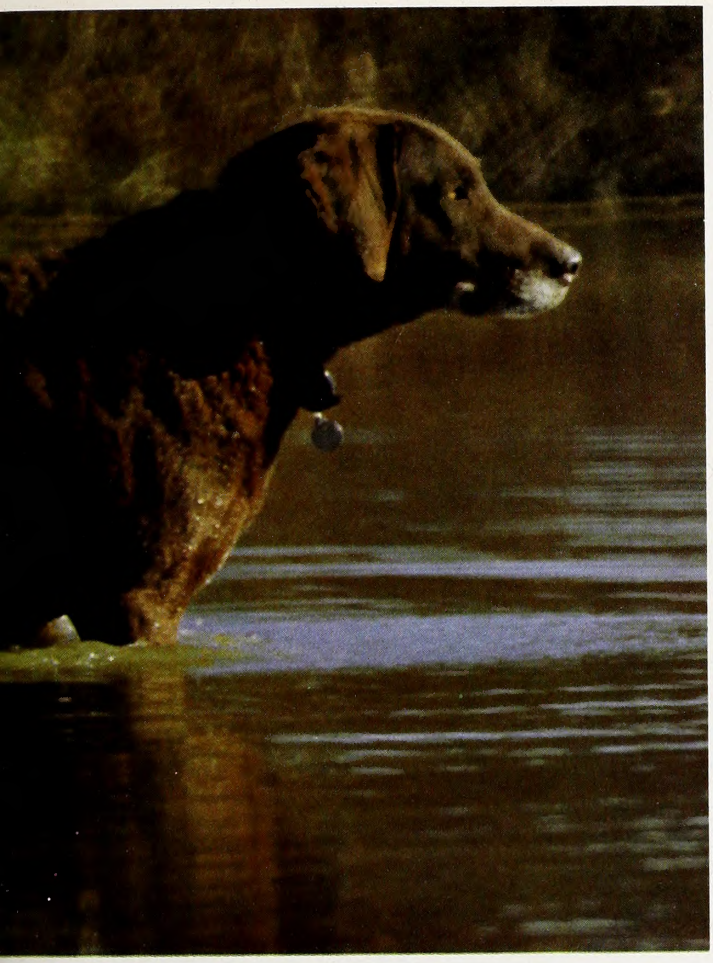


Retrievers

"If a man is really intelligent, there's practically nothing a good dog can't teach him." *The Old Man And The Boy by Robert Ruark**

Retrievers may be primarily associated with waterfowl hunting. But they can also be used on dove shoots and as pick-up dogs behind Pointers or trained to work in the manner of Spaniels, flushing upland game within gun range.

At the head of the class is the Labrador Retriever, an adaptable, easy to train, companionable dog that can be a good buddy as well as a proficient hunting tool and possesses a short, dense coat that comes in one of three colors, black, yellow or chocolate.

Three other retriever breeds are available and rate consideration: The beautiful, long-coated Golden Retriever; the rough ready, crinkle-coated Chesapeake Bay Retriever; and the clever, clownish, mop-coated Irish Water Spaniel. All are large, hardy, water-dogs capable of recovering downed ducks and geese.

Hunters and field trialers both have found the Labrador most practical and versatile. But the tough Chesapeake is unsurpassed for rugged jobs in saltwater under the most trying climatic conditions,

*1953, Holt, Rinehart And Winston, N.Y.

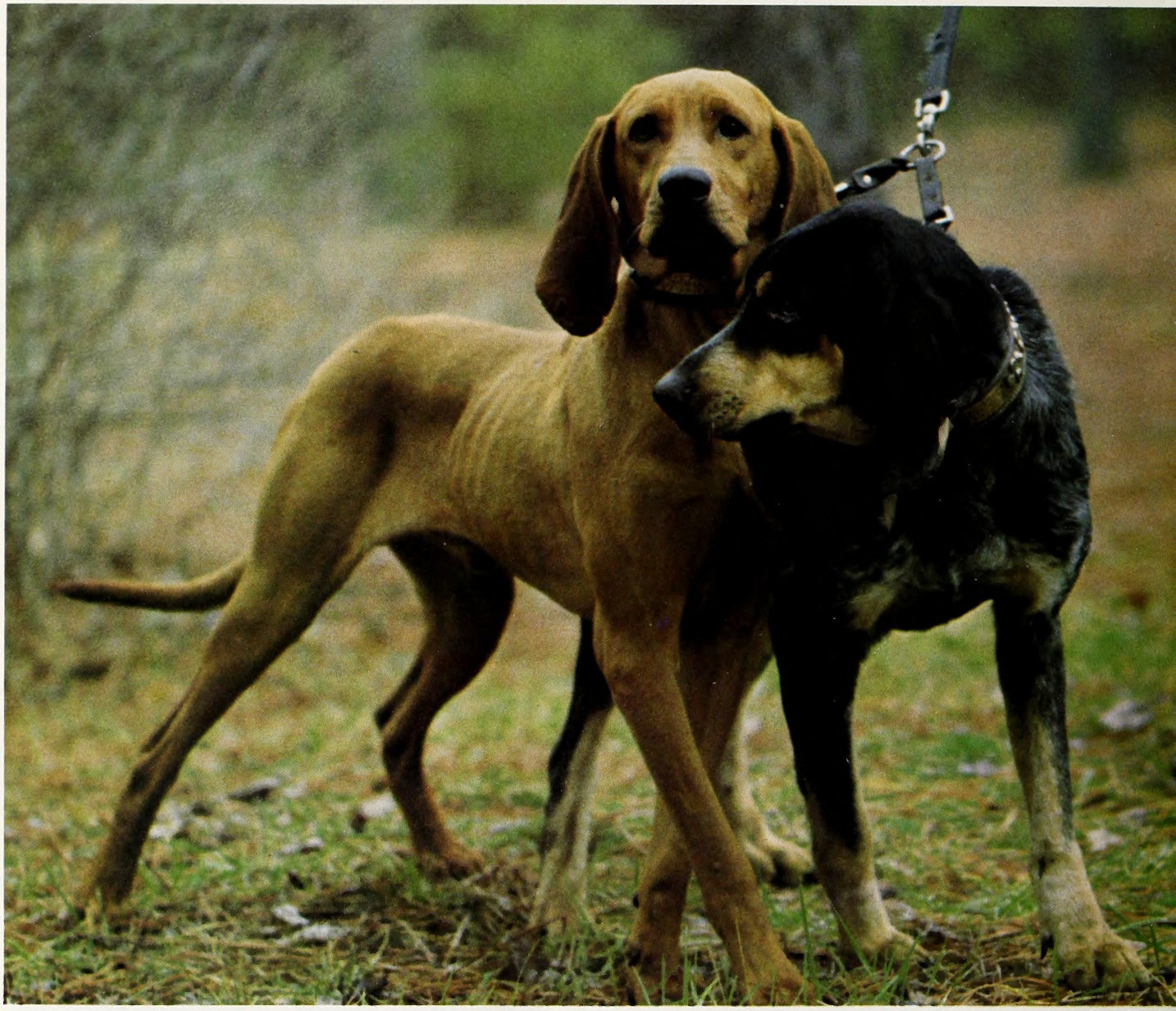
David Duffy has been hunting dogs editor for OUTDOOR LIFE since 1959, and is the author of six books about dogs and hunting. He is also a professional dog trainer and field trial judge. He lived in Halifax County for a year, but has since moved back to Wisconsin.

The black Labrador Retriever (below) is commonly used to fetch both waterfowl and doves. The Chesapeake Bay retriever (left and below left) is a thick-coated, stronger dog capable of plowing through ice to get a duck or goose.

Ken Taylor

the Irish shines in the marshes and bogs for jump-shooting and rail retrieving and the Golden makes a lovable, quick to learn family companion as well as a duck fetcher on inland waters.

Baymen have known the Chesapeake since the 1880's and it is one of just half-a-dozen breeds originating in the U.S. The rat-tailed Irish Water has been duck fetching in the U.S. for over a century. But the popularity of both breeds faded when Labradors and Goldens were introduced from Britain and caught the fancy of duck hunters prior to World War II.



Ken Taylor

Trailers

"I want a dog that is good, but not too good. I want nothing to do with a dog so perfect that he undermines my self-respect." *I Don't Want To Shoot An Elephant by Havilah Babcock**

Houndmen prefer the more specific term "hounds" when referring to gun dogs that trail game whether talking about little rabbit-rousters like the Beagles, Foxhounds that run sly Reynard, Coonhounds that tree masked bandits, or any trailer and bayer of big game like bear, boar and deer.

Good hounds, regardless of the game they are turned out on, possess strong natural trailing instincts, find their greatest rewards in the sheer joy of the chase and add to any hunter's enjoyment by sounding off as they trail and drive their quarry. For many sportsman the sound of music, "hound music," is as appreciated and certainly more exciting than an angelic serenade.

For dedicated followers of the chase, North Carolina is prime locale. Big bags of rabbits can be taken with Beagles, there are fox and 'coon for night-time hunting, good country for those who ride to hounds, arduous and risky hunts for boar and bear and most deer hunting clubs turn out non-descript packs to jump deer and move them onto standers.

The Plott Hound, once exclusively a specialist on dangerous game like bear and boar, was developed in the western North Carolina mountains by the Plott family and dates back to the mid-18th century. Plotts are now known nationwide, are used to hunt less formidable game and are listed as one of six recognized Coonhound breeds along with the Black and Tan, Bluetick, English, Redbone and Treeing Walker hound breeds. All are bred for treeing instinct and cold-trailing ability.

Mounted hunters who follow well disciplined packs (well-known hunts include the Moore County Hunt from the Southern Pines area and the Triangle Hunt of

*1958, Holt, Rinehart And Winston, N.Y.

Ken Taylor

To the hound man, no music is sweeter than the combined voices of a pack hot on the trail of a rabbit, raccoon, fox, deer or possum. Beagles (left and below) are considered America's most popular sporting breed, while the redbone and bluetick (far left) have their avid followers.

Ken Taylor

Raleigh) are likely to ride to English Foxhounds, American Foxhounds of the Maryland-Virginia or Penn-Marydel strains or to registered Crossbred Foxhounds (mixed English/American).

Informal, nighttime gatherings of men who spend a companionable evening around a hillside fire as their Foxhounds compete to take the lead in the chase of a hard-running predator are most likely to be harking to the cry of Walker, July or Trigg hounds, the more popular of the many strains of hard-driving, long-running hounds developed in the southern states to wear down and catch their quarry.

Being too close to the forest to see the trees, many North Carolinians are unaware of the prominence their state has in the world of gun dogs or the variety of opportunity its abundance of game and cover offers for hunting dog training and development. But the potential and actuality aren't oblivious to visitors and the Tarheel State has gained recognition in canine circles far beyond its borders.

North Carolina has hosted Foxhound National Championship trials, pointing dog trials of national import are regularly held near Hoffman on the Sandhills Wildlife Area and the 1977 National Retriever Open Championship was conducted near Weldon.

As the nation learns more about North Carolina's recreational potential, North Carolinians will continue to learn about varieties of hunting dogs their daddies and grand-daddies never knew existed.

Jim Dean

Jim Dean

Jim Dean

Holding 'em high and proud with tail aloft is the classic pointing style that field trial judges look for in both English setters (left, below) and English pointers (far left), but for the hunter, the important thing is the kind of intensity shown by this brace (left) which says "they're right here, boss." The Brittany spaniel (below) is growing in popularity in North Carolina.

Tim Hergenrader

Pointers

"Dogs," the Old Man used to say, "are a cut better than people, and should be treated according to their station and their worth."
*The Old Man's Boy Grows Older by Robert Ruark**

For good reason the Pointer is the odds-on favorite of North Carolina bird hunters. Like the Thoroughbred in horse circles, the blood is good and is turned to in most experiments attempting to improve hunting qualities of other breeds.

Frequently called an "English" Pointer in deference to its British origin, if there is a specific national designation the breed might better be called an "American" Pointer. It has been in the U.S., particularly in the south, that the Pointer developed into the ultimate quail dog.

Unsurpassed as a wide-ranging covey finder, the Pointer is the favorite of field trialers and horse-mounted bird hunters, but can be broke to hunt close in thick cover and has been doing its thing in our game covers for over a century.

**1957, Holt, Rinehart And Winston, N.Y.*

Runner-up in popularity in North Carolina is the English Setter, another breed more appreciated and fully developed in the U.S. than in the land of its origin. Setter fanciers like their gentle and affectionate natures and contend that long coats provide a shield against briar cuts and stubble abrasion and keep a dog more comfortable and eager to work in the cold and wet. Until the 1930s they were at least equally as popular as Pointers.

Pointer fans, on the other hand, argue that Pointers can be trained (broke) quicker, stand up better in hot weather and their short coats eliminate most of the nuisance of cockleburrs and the accumulation of mud, ice and other debris.

Rarely seen are the Irish and Gordon Setters, perhaps because their solid mahogany (Irish) and black and tan (Gordon) coloration makes them hard to see at a distance or when on point in thick cover; but, most likely, because there is such a small reservoir of good hunting stock from which to choose.

However, "field bred" Irish Setters trace their roots to eastern North Carolina. About 35 years ago, a sportsman named Ned LeGrande drew on some "red setters" from Enfield, N.C. in his efforts to reestablish the Irish as a gun dog after it had fallen into disrepute as primarily a "show dog."

The strain of Irish Red Setters used afield today has

Ken Taylor

benefited from introduction of English Setter and Pointer blood. But almost all such dogs trace their origins to a North Carolina bitch and dog, Askew's Carolina Lady (now in the Field Trial Hall of Fame) and Ike Jack Kendrick.

Of the so-called "Continental" pointing breeds, which started to catch on elsewhere in the U.S. less than 40 years ago, the Brittany Spaniel is best known to Carolinians. With a setter-like coat, but much smaller and naturally close-ranging, possessing innate spaniel curiousity to poke into every nook and cranny as well as strong pointing and retrieving instincts, the Brittany is one answer for coping with today's disconcerting quail tactics.

Bird hunters have been observing that quail now seem to fly in and out to feed, are filling up quickly, rather than walking between cover and feed and lingering longer on the edge. That means "birds in the woods" and Brittanys are in their element under those conditions.

Other less known breeds which also rate as workers in thick cover include the German Shorthaired Pointer, the German Wirehaired Pointer (Drahthaar), Pudelpointer, Vizsla, Weimaraner and Wirehaired Pointing Griffon.

All the breeds from Europe have docked tails, eliminating the sore and bloody appendiges displayed by hard-working Pointers and Setters. For the hunters who want a dove retriever or occasionally a duck fetcher as well as a quail and woodcock pointer all wrapped in a single package, the versatile Continental breeds are more adaptable and easier trained in the duties of non-slip retrieving than the traditional pointing breeds.

Joel Arrington

Down East Stripers: Unlocking The Mysteries

by Mark Taylor

"I say it's the commercial fishermen's fault. They take all the really big fish and destroy the broodstock. That's what's killing the fishing now."

"You can't blame them, they're just trying to make a living. What about the manufacturer dumping chemicals on to the spawning grounds? I say lay the blame on all those characters who are dumping PCB's into the Hudson River and Chesapeake Bay."

Joel Arrington

Cape Point on Cape Hatteras has become known as one of the best spots to catch striped bass on the Outer Banks.

"What about natural cycles? The fish have disappeared before, and they'll disappear again. You can't have a banner season every year."

Ask any group of striped bass fishermen if and why there's been a decline, and these three opinions are bound to crop up. For the past several years, stripers, or the lack thereof, have been staple item of conversation at seaside hash houses and sportsman's clubs from Hatteras to the Gulf of Maine.

To understand the striped bass situation in North Carolina, you have to know a bit about the critters.

First of all, we have two separate major coastal fisheries for striped bass, serving both commercial and sport fishermen. One is in Albemarle Sound and the other is off the storm-racked beaches of Cape Hatteras. There are also minor sport fisheries for stripers in Pamlico Sound, including the Tar and Neuse rivers, which feed the sound; and further south in the Cape Fear River.

Albemarle Sound is a curious blend of both fresh and saltwater. Flounder bite alongside yellow perch and it's not unusual for a largemouth bass fisherman to tangle with a bluefish. Its waters are officially coastal, and are managed by both the Wildlife Resources Commission and the state Division of Marine Fisheries. Several inlets connect the sound to the open sea, and a handful of large rivers, including the Chowan, Pasquotank, and Roanoke, feed the sound. Whether the waters more closely resemble a freshwater lake or the open sea depends largely on where you are. The salinity of the water runs from about 10 to 50 percent full sea strength, depending on location, weather patterns, and prevailing winds.

The Albemarle Sound stripers are also unique in that they're one of the few striped bass populations that generally live their lives out in one body of water. Their life cycle starts in the early spring, when they spawn far up the Roanoke River. When "stripers go a courtin'," it results in a dramatic encounter known as a "rockfight." When the time is ripe (soft music in the background, candle-lit dinners, right water temperatures), the eligible young bachelors will seek themselves out a plump female. When they find one, they'll swim swiftly alongside her, rubbing up against her to get her excited and creating an ungodly commotion. When the young lady is sufficiently aroused, she'll release a cloud of a million or more eggs, the males will release sperm into the water, and they can return to being carefree bachelors once again.

After one to three days, depending on water temperature, the eggs will have incubated and hatched. The newly hatched fry feed on the yolk sac until it is absorbed, then move on to bigger and better things. Plankton furnishes most of their grub, although they aren't averse to chowing down on each other, given the chance. As they grow larger, they gradually move into deeper water and work their way down toward the sound, eliminating most of the cannibalism. By the end of their first year, they run anywhere from two to five inches in length, and travel in schools. The fish can survive in water temperatures ranging from a low in the forties to a high in the mid-80's Fahrenheit.

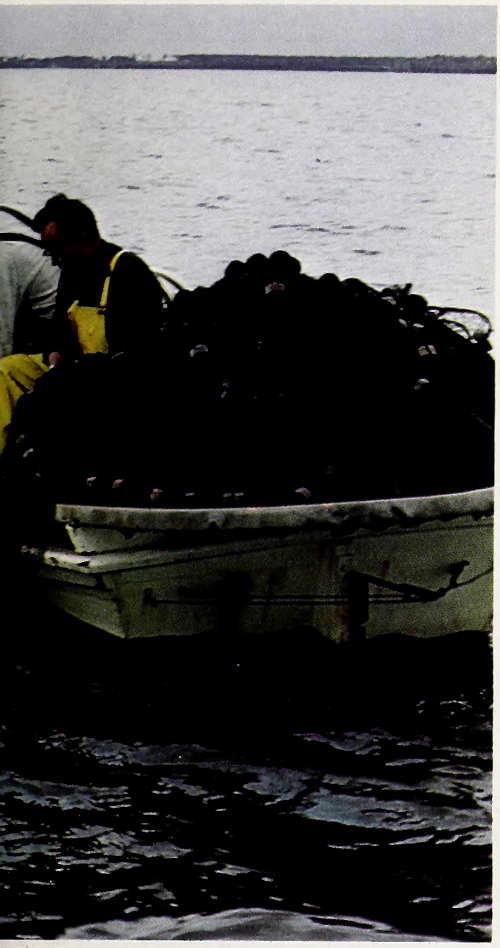
The fish in Albemarle Sound generally run in the "schoolie" size. Most of them weigh between three and 10 pounds, but occasionally larger fish are taken. Some of these larger fish are thought to leave the sound for the "big apple" outside, where they join the schools of large stripers that roam up and down the eastern seaboard. No one knows how many fish leave, but most biologists think it's a small percentage. Oregon Inlet, the link between the sea and the sound, has virtually no striper fishery at all, indicating that either the migration is small or takes place during the season when the fish seldom bite.

Although the sound's fish generally are smaller than their offshore brethren, the chance of taking a large fish does exist. The largest striper on record was taken from Albemarle Sound in the late 1800's by gill netters, and weighed in at about 125 pounds. Incidentally, the fish to beat on rod and reel was caught by Charles Church off the Massachusetts coast in 1913, and weighed in at 73 pounds. Church's record was disqualified last year on a dubious technicality, but it still hasn't been beat. Top it and you'll have a new world's record on your hands.

Division of Marine Fisheries photos

Probably few men are as familiar with the stripers of Albemarle Sound as Richard Guier. Guier is a fisheries biologist with the N.C. Wildlife Resources Commission, and has been watching the sound's striped bass for several years.

"Right now we're doing a joint study with the Division of Marine Fisheries to find out what the situation with stripers in the sound is," Guier explained. "The local feeling is that they've declined. We



Are haul seiners killing the striped bass by overfishing? Biologists don't think so, but point out that conflicts over the fish in the future between sportfishermen are inevitable. On Cape Hatteras in the early 1970's, the situation between the two groups was so touchy that fistfights were not uncommon.

can't really say until we know what the catch is for both commercial and sport fishermen, and we're gathering that now. Currently, we have no evidence that there's been a decline."

Although concrete evidence of a decline is lacking in a clinical sense, circumstantial evidence points that way. Scientists at N.C. State University, Dr. William Hassler in particular, have been sampling fish over the years by running trawls at set locations in the sounds. For the past five years, there have been slightly below average hauls each season.

"Usually you have a dominant year-class for stripers every four or five years or so, and we haven't had one of these in the 1970's," Guier said. "No one knows why these occur, but they happen when conditions are just right and a greater

number of fish than usual survive on the spawning grounds. By sampling and examining the last year's age-class now, we can see what's coming down the road for the next three to five years. There won't be a drastic decline, but we aren't going to have fantastic fishing either."

Mike Street, the chief of Research and Development for the Division of Marine Fisheries, runs the other half of the research project.

"Most of the commercial fishermen on the sound fish for different species at different times of the year," he explained, "but the striper furnishes much of their livelihood. Until we determine what their catch is, which we're working on now, we really can't do a good job managing the fishery."

The striper is an important species to commercial fishermen in North Carolina, and ranks eighth in commercial value statewide. In 1975, the value of the striper catch paid to fishermen at dockside was $630,000. In 1976, despite higher fish prices, the catches landed value was only $523,000.

Unlike many fisheries, sport fishermen take a substantial percentage of the total catch of stripers from Albemarle Sound.

"There was a study done from 1967 to 1969, showing the commercial versus sport catches in Albemarle Sound," Street explained. "For example, in 1969, the commercial catch was 914,000 pounds while sport fishermen took 187,000 pounds. Over the four years studied, anglers took about 25 percent of the catch. I don't think the sound is presently being overfished by either group, but the potential is there."

One possible source of alarm for both sportfishermen and commercial fishermen concerns the spawning grounds. Studies done by N.C. State University over the last 20 years have shown that about 80 to 85 percent of the eggs released on the spawning grounds are viable; that is they're fertilized, alive, and developing, shortly after spawning. In the last three years, the viability rate has dropped to between 45 and 55 percent. That's not an unhealthy figure for any river, but it's the trend that's significant.

"We have no explanation for this dramatic drop in viability, but could be one of two things," said Guier. "It's either an internal problem in the fish themselves, or it's a problem in water quality. I can't think of any explanation for the second theory, so my best guess is that the fish are picking up some type of pesticides or chemical compounds, like PCB's, which are causing the internal problems. Up on the Chesapeake Bay and Hudson River, they've had a lot of problems with PCB's, which are a by-product of the plastics industry. The PCB's do affect reproduction and egg viability. The ironic side of this is that we've studied stripers between northern Florida and Maryland, and our fish are the cleanest of the lot. As a matter of fact, most of the rivers running into the sound are cleaner now than they've been at any time in the last 20 years."

Mike Street sees other problems in the future.

"I think the biggest problem we're going to face in managing stripers on the sound is the conflict in uses, particularly between sport and commercial fishermen," he said. "The commercial fishermen here use anchored gill nets, which are left out overnight untended, and are hauled every day. A lot of these nets get molested or torn up by sport fishermen. Although the situation isn't near as touchy as it was in the Cape Hatteras area a few years back, the friction is still there. I think the whole problem boils down to people's lack of respect for a man's right to earn a living and for his personal property. I guess that's all I'd better say."

North Carolina's second striper fishery is on Cape Hatteras's lonely outer banks. The fish that come in here are truly a cosmopolitan lot; at different times of the year they might

be found anywhere on the eastern seaboard within the stripers' home range. When a fisherman in Rhode Island or Nova Scotia or Maryland talks about a striper decline, it's these big sea-roving fish he's referring too.

Probably no one knows more about east coast stripers than Frank Woolner. Woolner, the editor of the "Saltwater Sportsman" magazine could well be called the "Dean of Saltwater Fishermen." Among surf casters he's the elder of the tribe and he holds his own opinions on whether stripers have declined.

"I think the stripers have declined, but it's a cyclic thing that occurs naturally," Woolner said. "Stripers have had booms and busts for the last 300 years, and no one really knows why. In this century, from the 1900's to the 1930's, there was a striper shortage. Then they boomed, now they're declining again. It's one of those things that happens, not just with stripers, but with lots of other fish too — especially bluefish."

The big stripers which are taken on the outer banks are generally born in Chesapeake Bay. From the Chesapeake, they go north in the spring, sometimes as far as Canada's Maritime Provinces. As the northern waters cool in early fall, they start moving south and winter over on the outer banks, arriving about the first of December. In the spring, they return to the Chesapeake to spawn. Biologists believe that the fish return to the waters of their birth to spawn as salmon do, and that somehow they store a chemical imprint of their native streams.

"When you talk about east coast stripers, you're talking about Chesapeake Bay," explained Woolner. "A massive percentage of all of the east coast stripers are born there, and if those spawning and nursery grounds aren't protected, the fishing will suffer. We've got to stop pollution and prevent the dumping of PCB's onto the spawning grounds; pollution is like cancer, it's very serious but it can be cured."

One prevalent theory on the decline is that commercial fishermen have destroyed striper populations by overfishing. The bad blood between commercial and sport fishermen almost resulted in open warfare on Cape Hatteras in the early 1970's, when the two groups were competing for the same stretches of beach, with room enough for neither.

Joel Arrington

Surf casting is one of the most popular ways to fish for stripers, and few thrills in life can compete with standing waist deep in the suds trying to bring a big striper to gaff.

Sport fishermen often refused to let commercial fishermen have enough room to haul-seine fish from the beach. Commercial fishermen, in turn, would often circle anglers with nets and not give them the time of day. It wasn't unusual for a sport fisherman busy playing a fish, to suddenly find himself surrounded by a seine and hauled up on the beach along with a load of stripers, bluefish, and other denizens of the deep.

This understandably riled sport fishermen, and inconsiderate sport fishermen understandably riled commercial fishermen. Fist fights were common, knife fights occurred occasionally, and if there had been a shooting, no one would have been surprised. A marketing problem for commercial fishermen also added fuel to the fire. The market for bluefish would become glutted so quickly that it wasn't unusual for a man who'd made a big catch to find he had nowhere to sell it. The lack of transportation and storage facilities forced many fishermen to leave large catches of blues on the beach to rot, although stripers were always in demand and were always sold. With the combination of big striper catches, rotting bluefish, and bad blood, sport fishermen were quick to place the blame for the vanishing stripers on their commercial counterparts.

"They've been haul-seining stripers for well over 100 years and it hasn't hurt the fishing substantially," Woolner said. "You'll get your fish on the outer banks about December 1, and sportfishermen will take a few, while the commercial fishermen will really kill 'em. Then they'll go logey because of the cold water and won't take a plug; but because they've slowed down they won't be scared of a net, and the haul-seine fishermen will continue to take big catches. But what you've got to remember is that the really big fish, the ones 35 pounds and up that are often taken by the seiners, are past their prime when it comes to egg-laying. It's the schoolie stripers in the 12- to 20-pound range that are the prime breeders."

Frank Woolner also sees a few clouds on the horizon, and has his own ideas on the problems facing stripers in the future.

"One of the main problems we're facing now is we're managing stripers in individual states, when we should be managing the entire seaboard," he said. "We need more striper research and a management plan for the whole east coast, because these fish don't restrict themselves to state boundaries. And we've got to continue to work to halt pollution, and protect Chesapeake Bay at all costs. As for the present decline in the fish, I'm not worried. They've been booming and busting since the pilgrims landed, and I'm sure they'll boom again."

PCB's, pollution, heavy fishing pressure, natural cycles; it's hard to predict what's in store for the striped bass in the short run. But one thing's for certain: As long as there are men looking to tangle with one of North America's finest fishes, striped bass will continue to be a staple item of conversation at hash houses from Albemarle Sound and Cape Hatteras to the Gulf of Maine.

Mark Taylor is Assistant Editor of "Wildlife in North Carolina" and writes many of the features for the magazine.

Conclusion

A Collector's Guide To:

DECOYS AND THEIR MAKERS

BY JAMES S. LEWIS, JR.

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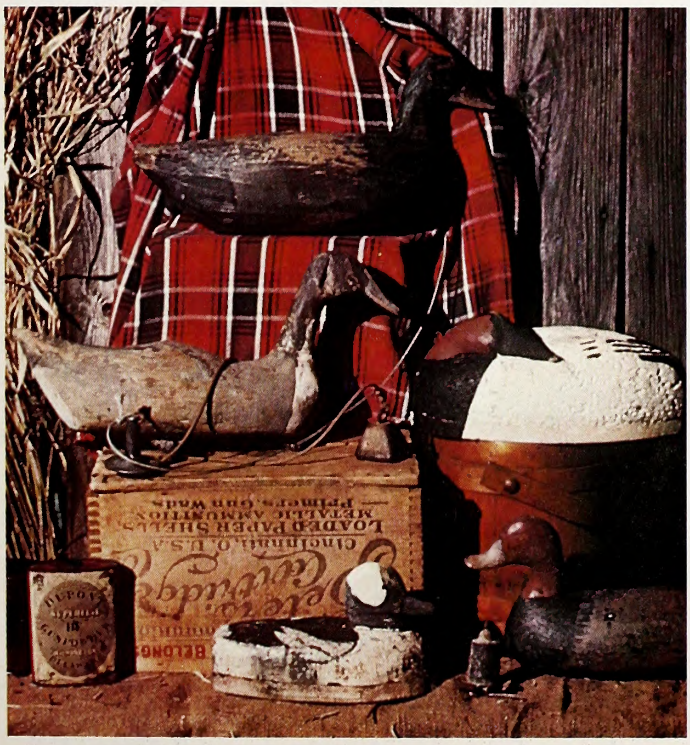


This marks the final segment in this collector's guide to some of the waterfowl decoys used in North Carolina down through the years. No doubt, the many men who carved these old blocks would be surprised — and pleased — to know that their handiwork has survived them, and will be collected and passed down as prized possessions through the years.

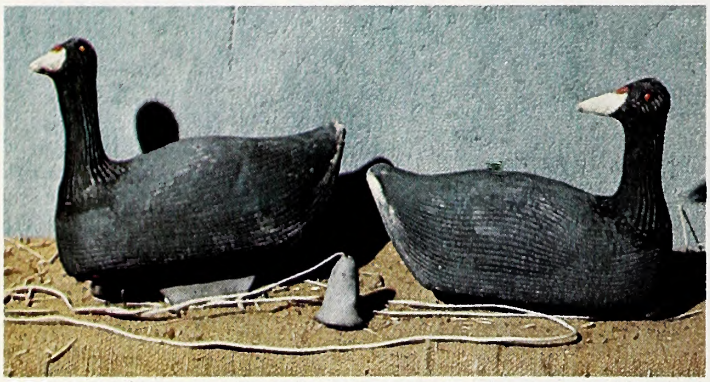
Shorebirds are among those species of interest to sportsmen, and it was an exceptionally good stroke of fortune which enabled Bill Underwood, a decoy carver and collector of Goldsboro, to come along last year shortly after Irving Fulcher of Stacy had found a carton of old "snipes" which his father, Charles Fulcher, had made long before the twentieth century dawned. A charming little knothead, cypress-bodied primitive, is shown in Fig. 28. Though the carving of the little cypress bodies may reveal a minimum of artistic feeling, the attitudes resulting from the choice and arrangement of the heads surely reflect the selective eye of an artist.

Also of fairly recent origin are the decoys shown in Fig. 29, which are made by Alvin Harris (deceased) of Atlantic. This artist and hunter made decoys for his own use only, which probably explains his choice of balsa for his ducks and cork for his geese. A remarkable feature of his ducks was his use of balsa for the heads too, which would have been an impractical choice, had they ever been subjected to normal treatment in the hands of other hunters. It must be assumed that he used exceptional care in handling in order to avoid damaging the heads. Harris was an artist of exceptional talent, which in his decoys was displayed at its best in the uniquely odd and graceful heads of some of his ducks. The heads of the pair of redheads and the brant, shown in Fig. 29, illustrate his style.

The pair of lifelike, cloth-covered fiberglass coots shown in Fig. 30, though neither handcarved nor early, surely deserves to be mentioned for the ingenuity of their maker, Emmet White, formerly of

The makers of these five typical Core Sound decoys in figure 32, remain unidentified. Clockwise from top: blackduck, canvasback drake sleeper made of cork, redhead drake with unusual laminated head design, cork bufflehead drake and roothead Canada goose. The photo at top left shows details of roothead brant by Gary Bragg.

Figure 28 pictures three very old, primitive, knothead shorebird decoys. The heads were made from myrtle twigs. A pair of lifelike coots by Emmet White is shown in Figure 30. The five balsa decoys in Figure 29 were made by Alvin Harris. Note the unusual style of the heads of the brant and of the matching pair of redheads. The unpainted roothead duck and twig head shore birds of red cedar in Figure 31, are by Howard O'Neal, a contemporary carver of Ocracoke.



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28^

v31

Knotts Island. Judging by the large number of these coots which were found mounted on racks or piled loose in the back of an old store, it probably is safe to assume that Mr. White must have been an avid coot hunter.

When I made a recent stop in Ocracoke, hoping to glean more information about the early decoys of that area, Maurice Ballance directed me to (among other possible sources) the home of Howard O'Neal, who I found carving shorebirds in his backyard shop. Mr. O'Neal (no youngster) uses red cedar, which he cuts and dries as he finds it available on the island, then carves into knothead ducks and shorebirds, that he sells unpainted to tourists. Examples of his current work are pictured in Fig. 31.

A final word is appropriate to thank those who have not already received recognition in the earlier portion of this series. For information about the early decoys carvers who lived and worked along the shores of Core Sound, I am indebted to Roy Willis of Stacy and Gene Pond of Beaufort, both of whom are duck hunters and decoy collectors, and both of whom contributed generously of their time and knowledge. To others who also contributed information and decoys, but who were not recognized here, our apologies.

I hope that in the presentation of this material, I have managed to help enrich the already rich traditions of waterfowling for those of us who love the birds we hunt and want to see them enjoyed by all people, including hunters, in future years.

James S. Lewis, Jr., is an avid waterfowl decoy collector, and heads Lewis Construction Associates, Inc., of Goldsboro, N.C.

Back of the Book

For 1816 Deer Poachers!

39 Lashes, Well Laid On . . .

How early were the first game laws passed? That's hard to say, but the first federal wildlife law was enacted by what then passed as the federal government in 1776. The law closed seasons on deer in all of the southeastern states except Georgia, and with good reason. Deer hunting in that era set the tone for the buffalo hunts that followed a century later. Deer skins were in big demand in England prior to the Revolutionary War; and in one peak year, 1748 to be exact, 160,000 hides were shipped across the water from South Carolina alone.

Massachusetts was the first colony to bite the bullet and try to pass a "state" game law in 1648. They passed a closed season on deer, which was largely ignored.

North Carolina's first game law was passed in 1745 closing the season on deer between February 15 and July 15, according to information sent to us by Mrs. Stuart Thomson of Washington, North Carolina. The fine for breaking the law was 40 shillings. By the early 1800's, the state had a fairly rigid set of game laws. According to the North Carolina Code of Justice for 1816, sent to us by Mr. John Tuttle of Germanton, a few of the laws are as follows:

In 1816, fire hunting or jacklighting deer or any other animal was illegal, as it is today. The fine for the offense was 20 pounds, and if the offender was unable to pay the price he would receive "39 lashes on his bare back, well laid on, in open view, by the sheriff; and stand committed until costs be paid." Refusing to give evidence against a fire-lighter was also effectively dealt with, "any witness who refuses or neglects to give evidence, he shall be committed to the county jail until he shall." And a slaveowner who sent one of his slaves out fire hunting was subject to the same penalties as any other offender was.

Killing a deer and leaving it in the woods was also illegal, and punishable by a fine of 20 shillings per offense. There was also a posting law that allowed a landowner to prohibit hunting on his property. All he had to do was post an announcement in two public places either prohibiting all hunting on his land, or naming the people he didn't want hunting on his acreage.

— Mark Taylor

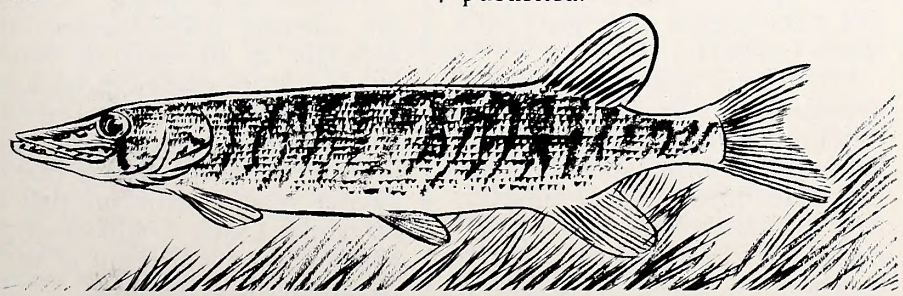
New Fish In Mecklenburg County

A recent study of the fish life of Mecklenburg County, done by two scientists from Duke Power Company, has turned up a few surprises. Six species of fish not known to live in the county were found, according to the Charlotte Nature Museum, which is publishing the results of the study.

Donald Cloutman and Larry Olmsted, both biologists at Duke Power's Environmental Laboratory on Lake Norman, undertook the task. Among the species they found that were not known to exist in the county were the Carolina darter, the speckled killfish, the redfin pickerel, the coastal shiner, and the smallmouth and bigmouth buffalo fish.

The Carolina darter was recently recognized at a symposium on rare and endangered species in North Carolina. The speckled killfish was not known to exist any closer to the county than the Pee Dee River drainage region, the redfin pickerel was thought to be confined to the Coastal Plain, the smallmouth and bigmouth buffalo fish were not thought to be that far east, and the coastal shiner was not supposed to be found north of the Santee River drainage system.

The biologists found about 200 different species of fish in the county, and maps showing the range of the different species will be included in the study when it is published.



November Enforcement Report

For the month of November, 1977, the North Carolina Wildlife Resources Commission checked a total of 32,730 hunters and fishermen and 218 boaters.

Of the hunters and fishermen, 967 were prosecuted and 846 convictions were obtained. The total fines collected tallied up to $12,097 and the total costs collected were $18,447.

For boaters, 275 prosecutions were made and 240 convictions obtained. Total fines collected tallied up to $567 and total costs collected were $6,057.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

Meat Versus Blubber

A recent survey of seventh through twelfth grade Michigan students brought to light some interesting attitudes toward wildlife. More than 90 percent felt wildlife should be protected because it is part of nature, because they want to learn about it, or because they enjoyed watching it. Only 35 percent felt wildlife was also important because people want to hunt, and the majority valued the aesthetic qualities of wildlife more than the utilitarian ones. Almost all the students indicated they watched wildlife television programs and these had the greatest influences on their attitudes.

It's interesting to note that the survey found television wildlife programs left the students with many misconceptions about biological processes, including the effects of forest fires on wildlife, forest succession, and wildlife as a renewable resource. Children who had hunted demonstrated greater knowledge of biological processes than those who did not hunt or were opposed to it. Could it be that those popular TV wildlife shows are not telling the whole truth? It certainly seems that way, and since more and more kids live in urban areas, they're swallowing every word as gospel. We suggest that you encourage your own children to watch wildlife shows, and that you watch with them. With a little guidance, they'll soon be able to tell the difference between the "meat" and the "blubber."

—December 1977 Outdoor Oklahoma Magazine

Wildlife Staffer Honored

Jim Dean, associate editor of WILDLIFE IN NORTH CAROLINA, was recently awarded Trout Unlimited's 1977 National Trout Conservationist Of The Year Award at the annual conference in Bozeman, Montana.

The award was presented "for distinguished and dedicated service to the cause of the cold water fishery resources and the improvement and perpetuation of the recreational qualities of fishing on the American Continent."

Dean has written extensively about trout fishing and stream preservation, including articles in WILDLIFE IN NORTH CAROLINA which helped call attention to the potential loss of Steels and Upper creeks to highway construction (since saved through the cooperative efforts of the N.C. Wildlife Resources Commission, U.S. Forest Service and N.C. Department of Transportation). He has written similar articles on mining, pollution, development, and other threats to North Carolina's trout fishery which also appeared in WILDLIFE IN NORTH CAROLINA and WILDLIFE AFIELD, a weekly newspaper column which he has written for the past eight years.

Fur Sales Approved

On December 27, the N.C. Wildlife Resources Commission received formal notice that the Endangered Species Scientific Authority had approved entry of properly tagged bobcat and otter pelts from North Carolina into international trade.

Trade limitations had been imposed on bobcats and otters out of concern that increasing demand in the face of decreasing supply would endanger these and other species. Trapping records provided by the Wildlife Resources Commission provided required assurance that no serious inroads had been made into populations of these two species to date and that there is an adequate monitoring system to detect a drop in population levels. Accordingly, the Endangered Species Scientific Authority has been authorized to export up to 800 tagged bobcat pelts and 1,200 tagged otter pelts from North Carolina.

Fur dealers may purchase the necessary tags from the Wildlife Resources Commission for $5 each. For further information contact Mr. Dick Hamilton, Assistant Director, N.C. Wildlife Resources Commission, Archdale Building, 512 N. Salisbury St., Raleigh, N.C. 27611.

— Frank Barick

Restoring Streams Lets Do It Right!

Stream channel restoration in areas recently devastated by floods in several western North Carolina counties can result in long-lasting destruction of valuable sport fishing resources if proper attention isn't given to restoration design and procedures. A natural reaction to such floods is to increase the width and depth of stream channels and to eliminate natural meanders so as to accelerate the removal of flood waters. This "channelization" eliminates the meanders, pools, and riffles that characterize a natural stream and are essential elements of its fish producing capacity.

Federal Disaster Relief funds are being made available to restore damage caused by the floods. Much of it will be for restoration of buildings, bridges, and roads. In many places this will involve putting the stream back in its original channel, in others it will involve clearing the original channel of rocks, trees, and other debris. If this work is done properly it can help to restore the original fish producing capacity of the stream. If it is done improperly it can drastically reduce fish production for many years. And doing it right will not cost any more than doing it wrong — probably less.

The restored stream channel must have feeding, resting, and hiding places for fish. Fast water riffle areas are especially conducive to food production. Pools at bends in the stream or below waterfalls make good resting and hiding places. Large boulders scattered throughout the channel provide the same effect. Shade is also necessary to prevent excessive high water temperatures.

Wildlife Commission biologists are working with disaster relief officials in developing proper channel design specifications. Landowners who want stream restoration work done on their property should make sure that the habitat requirements for fish are being met. Doing it right won't cost anymore, and will result in better fishing in the years ahead.

—Frank B. Barick

How Cold Was It?

Southern sportsmen who dislike cold should count their blessings when comparing their plight to the burdens carried by their northern counterparts.

When I was home in New Hampshire for the holidays, it was so cold that when we went rabbit hunting we had to pack along a spare car battery and booster cables just to start the rabbits.

—Mark Taylor

Love Potion Number Nine?

Folks having problems with critters eating crops should be grateful, if they compare their situation with some others. Take the village of Dares Salaam in Tanzania, for example. The folks there have been raided by a three-legged, man-eating lion that has killed eight people and attacked four others in the last three months. More than 1,000 scouts, soldiers, and villagers hunted the lion for several weeks before tracking it down and destroying it.

Wildlife officials say that the lion became a man-killer because it couldn't catch anything else due to its missing leg. But the villagers have another explanation. According to the natives, the lion was actually a woman who had gone to a witch doctor seeking a love potion to win back the affection of her husband, but had been given the wrong potion and was transformed into a lion.

That witch doctor ought to take out some extra malpractice insurance, quicklike.

Ice Chest Was Men's Best Friend

R.B. Pixley and Ben Kirby owe their lives to, of all things, a Coleman ice chest, according to the Roxboro Courier-Times.

The two men were fishing Kerr Reservoir not too long ago when they were hit by a sudden squall. Five-foot waves soon did the job, and their 15-foot boat swamped. There were life jackets in the boat, but neither man had one on. In the cold and choppy water, putting a life jacket on was virtually impossible, as it always is once you're in the water, and the men were in dire straits. Shortly after the boat sank, they heard a big "boom" and saw one of their large Coleman ice chests pop out of the water. Ben Kirby worked his way to it and got back to his companion. Each linked an arm through a handle and two hours later, when they finally hit shore, their ordeal was over.

Both men learned their lesson. "Get one of the newest life jackets available and keep it on," Pixley said.

Another lesson each knew and practiced also did its job. They weren't fishing alone, and were able to help each other.

"Without Ben, I wouldn't have made it," Pixley commented. "I'm 60 years old, have had two heart attacks and am short of breath. He got that ice chest, which I couldn't have done, and then encouraged me enough to keep me going. When we hit shore, he was able to summon help and get us to a hospital."

Gas Guzzlers Chilling Facts

Anyone doubting the average American's dependence on the automobile might be interested in hearing a few facts put out by the National Wildlife Federation. They present a chilling picture.

Residents of the United States drive 133 million motor vehicles, about 50 percent of all the motor vehicles in the world. They use an average of 877 gallons of gasoline each per year.

Every day about 10,000 new drivers obtain licenses and an additional 10,000 vehicles, nationwide, are added to our highways.

The average American family now spends more money on transportation than on food.

Highway construction has destroyed more homes than have been built by our entire national public housing program.

Wild Turkey Brochure Available

The North Carolina Wild Turkey Federation has published a pamphlet on the status of the wild turkey in the state entitled "The Return of the Wild Turkey Depends on You."

Copies of the brochure may be obtained by sending a stamped, self-addressed envelope to the North Carolina Chapter of the National Wild Turkey Federation, Director J.N. Weakly, 207 Bennington Drive, Chapel Hill, N.C. 27514.

He Should Have Danced All Night!

"She was all dressed up with no place to go, her feelings were hurt, and she was getting vindictive. Her husband had promised her a night on the town and they were just about to leave when the phone rang. It was one of her husband's chums, wanting him to go hunting with him. Before she could turn around, her night of dancing was off, and hubby was disappearing down the road in outdoor garb."

"The woman may have felt like crying, but she didn't, and she didn't go home to mother, either. Instead, she picked up the phone and called a Game and Fish Department officer, who proved as sympathetic as her best friend could have. Because deer were out of season just then, and hubby and his buddy were planning to do their deer hunting at night, with a light . . ."

Wildlife officials often complain that we won't really have efficient enforcement of our game laws until people care enough to turn in violators. This case came from the Arizona Fish and Game Department's Wildlife News. Undoubtedly, this woman's call was clearly "above and beyond the call of duty," and both men were convicted. "Hubby" would have been a lot better off if he'd just gone dancing.

Geese Up, Ducks Down!

Waterfowl Lovers Face Good News And Bad News

Recent surveys by the U.S. Fish and Wildlife Service may leave Tarheel waterfowl lovers with mixed feelings; on one hand, last year saw the largest number of waterfowl wintering over in the state in the past 20 years. On the other hand, certain species, especially puddle ducks, are bound to decline in the years ahead.

In 1977, the total number of ducks wintering over in North Carolina increased for the fourth year in a row, with a record 20-year high of 350,700 birds. This is up 16.6 percent from 1976's total, and is up 76.8 percent from the previous 10-year average. Surveys show that 594,800 waterfowl of all species, including geese and swans, wintered in the Tarheel State during the 1977 season.

"There are several reasons for the increase in the number of ducks in North Carolina last winter," said Grady Barnes, a biologist with the N.C. Wildlife Resources Commission's Division of Game. "First of all, they've had several good years on the breeding grounds in the arctic, which has helped the duck population overall. Last year's cold weather also pushed down a lot of birds that would normally have wintered farther north in the Chesapeake Bay area of Maryland and Delaware. When the marshes froze over, the birds had nothing to eat, so they moved south to where feed was available. Acquisition of breeding grounds in the arctic by Ducks Unlimited and the Canadian Government has helped a great deal, as has federal and state governments acquiring wetlands along the major flyways. We've also got better feed conditions in the sounds than we used to. With less pollution the eelgrass is coming back, and we haven't had any major hurricanes tearing up the bottom for a few years."

The bad news is from out of the west. Last summer's drought dried up many of the potholes, small sloughs, and marshes that are the breeding areas for many of the puddleducks and some of the divers. These include the canvasbacks, pintails, redheads, green and blue-winged teal, and mallards. These birds, which are found in abundance in North Carolina in the fall, breed in the spring in the three Canadian Prairie Provinces and in North and South Dakota. A few of the figures put together by the U.S. Fish and Wildlife Service show an alarming trend.

In 1955, there were 7,303,000 ponds holding water that were used for breeding in May in Manitoba, Saskatchawan, and Alberta. In 1976, that number had dropped to 2,002,000 ponds.

"The number of breeding ponds varies from year to year due to drought and weather conditions, but overall the trend has been downward," said Barnes. "With the new clean methods of farming, a lot of these potholes and wet areas have been drained and put into production. It may be good for agriculture, but it sure is hurting waterfowl. Ducks Unlimited and provincial and state governments are buying up what they can, but there's only so much they can do. For example, the mallard population is down five percent over last year. If we continue draining these breeding grounds for agriculture, it can't help but hurt duck populations considerably."

In contrast, the Canada goose has boomed along the Atlantic Flyway, and agriculture plays the hero rather than the villain.

"You could probably safely say that the Canada goose population in the Atlantic Flyway has doubled over the last 10 years," said Barnes. "In 1976, there were 785,000 Canada's in the Atlantic Flyway, and in 1977, there were 924,000 birds. The increase is solely due to agriculture. In many of the states in the midwest and along the Atlantic Flyway, we've gone to putting in large cornfields with mechanical harvesting. Well, the geese are now chowing down on surplus corn in those fields, instead of feeding in the marshes. There's a lot more feed now, so they're breeding more than they did when they depended on marshland for food. One bad aspect of this is there are fewer Canada geese wintering over in North Carolina now than there used to be. They're feeding on those bare cornfields all winter up in Pennsylvania, Maryland, and other northern states. They used to come down here or go further south looking for unfrozen marshes, but they no longer have to do that since they have all the food they need up north. The same thing has happened along the Mississippi Flyway. Canada geese used to go clear to Louisiana looking for food, now they're wintering over in Minnesota and Wisconsin."

—Mark Taylor

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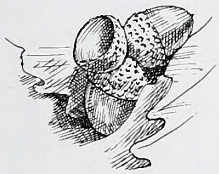
Wildlife Foods Are Scarce In Winter

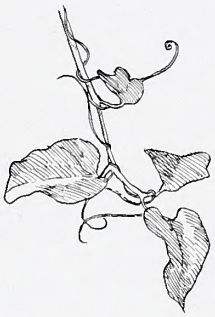
Flowering Dogwood

Perhaps the flowering dogwood is best known as our State's official flower, but in winter the wood duck, ruffed grouse, quail, rabbit, deer, turkey and many songbirds recognize this tree as a dependable source of food with the fruits, buds and twigs all being utilized.



Oak and Hickory Trees

North Carolina is blessed with many species of both oaks and hickories, acorns and nuts from which are used in varying degrees by many species of wildlife including deer, squirrels, raccoons, bears, turkeys, grouse, wild boar, quail, several species of waterfowl and many songbirds. Oaks may be the State's major wildlife food producer.



Greenbriers

Grouse, quail, turkeys, wood ducks, songbirds, raccoons, rabbits, deer and even bears consume the fruits, stems and foliage of the several kinds of greenbriers which are found across North Carolina.

Rhododendrons

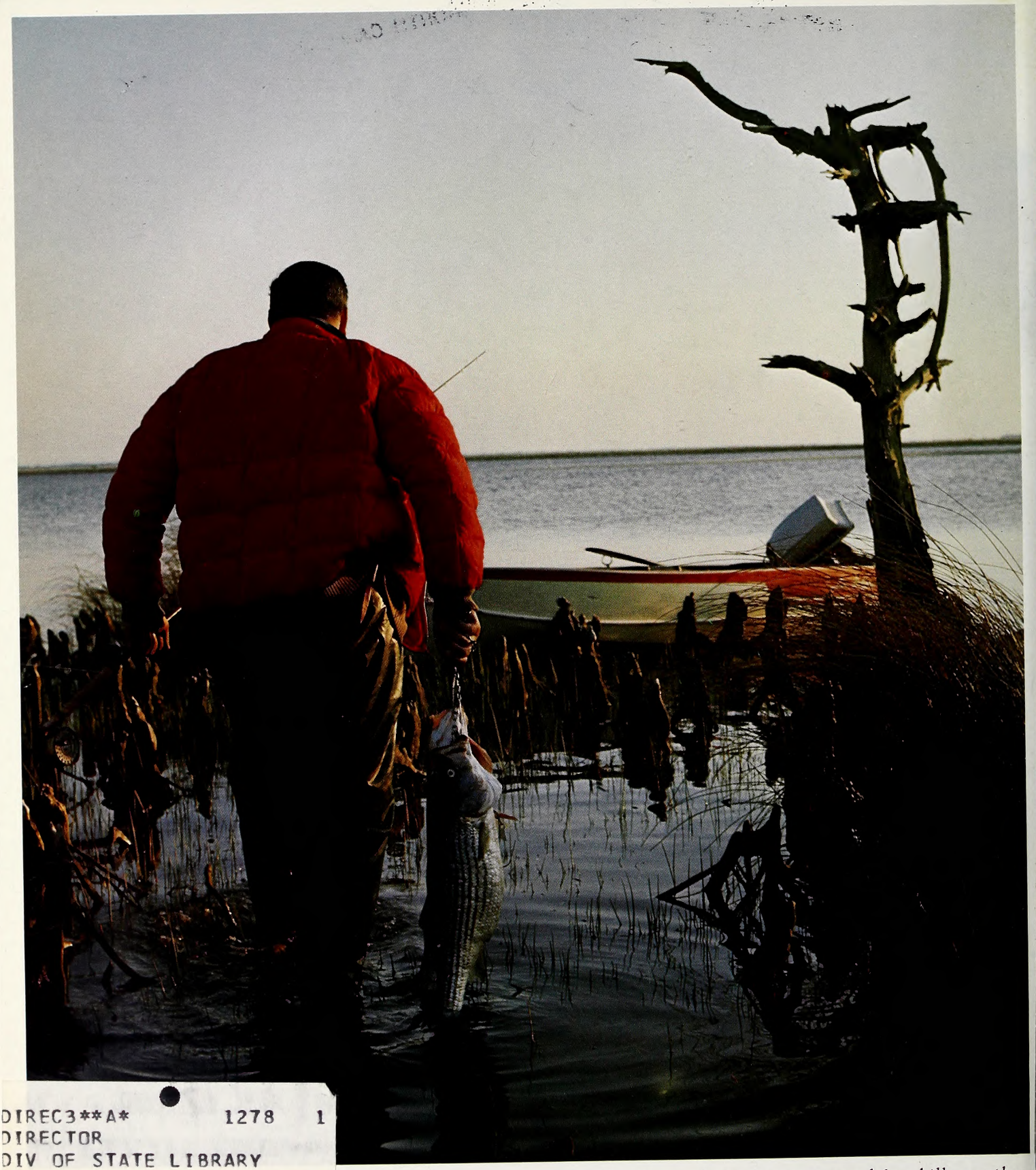
In addition to providing dense cover on a year-round basis, rhododendron foliage and twigs provide a principle food source for deer in the State's mountain region. Ruffed grouse have also been known to feed on rhododendron buds.

Lespedezas

Several species of both native and introduced lespedezas are found in North Carolina. These plants, due to the hard and persistent nature of their seeds, provide food for quail, grouse, doves, turkeys and other seed-eating animals. The Wildlife Commission provides free lespedeza seed each spring to landowners who will plant them in suitable sites where they can produce wildlife food.

Cold winter weather may have harsh effects on wildlife, especially when snow or ice cover otherwise available foods. While in general foods become less abundant in winter, those animals which have built up reserves of body fat during the summer and fall can usually depend on such plants as oaks, hickories, dogwoods, rhododendrons, lespedezas and greenbriers to provide them with adequate food until the green days of spring and summer return. The supply of these natural foods can be enhanced by preserving food-producing plants as well as by leaving bean, corn and grain stubble undisced as long as possible.

By Sid Baynes



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For the anglers who go prepared for chilly weather, striped bass provide plenty of mid-winter fishing. These stripers were taken on light tackle from East Lake.

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WILDLIFE IN NORTH CAROLINA

MARCH 1978

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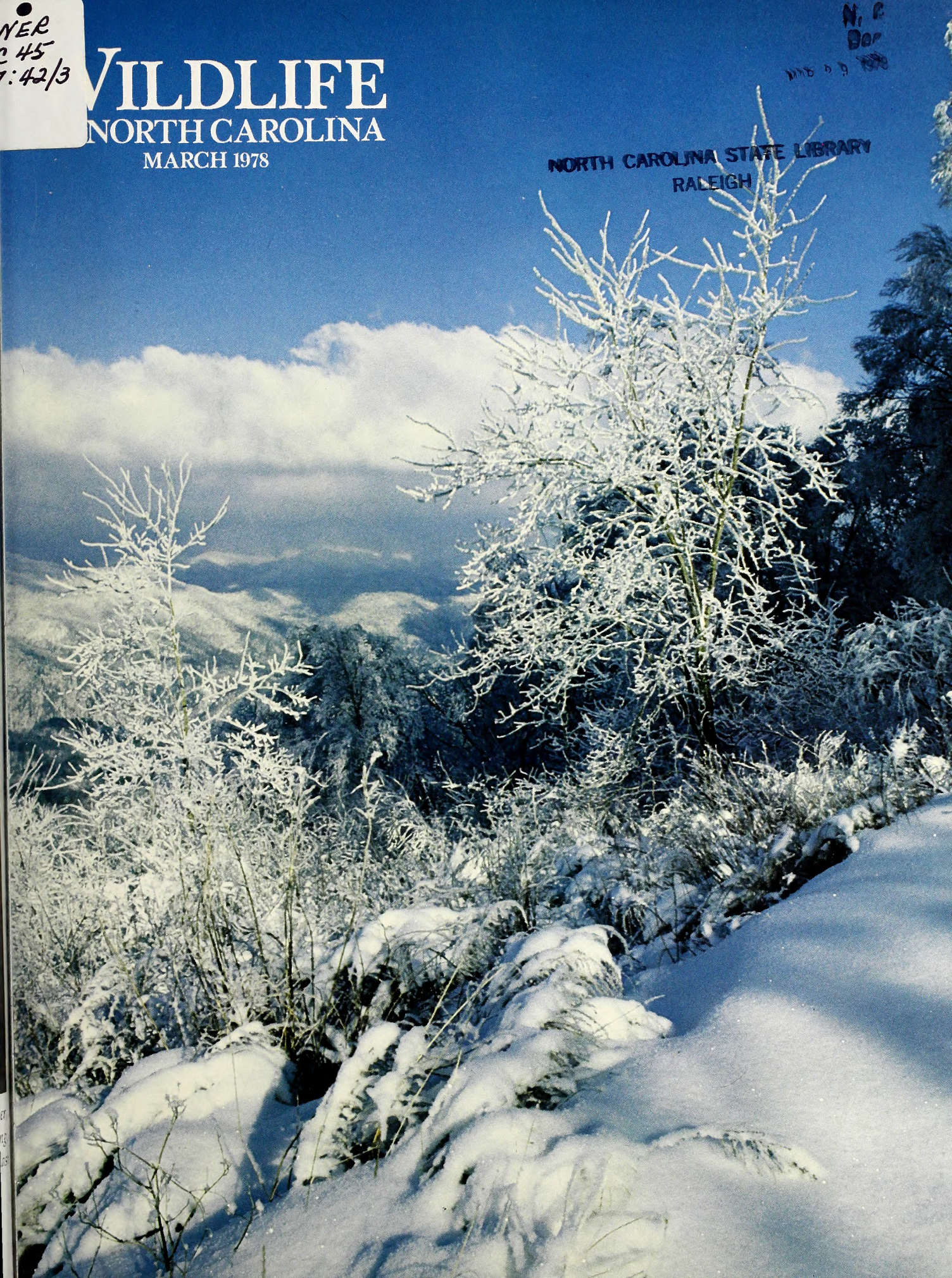
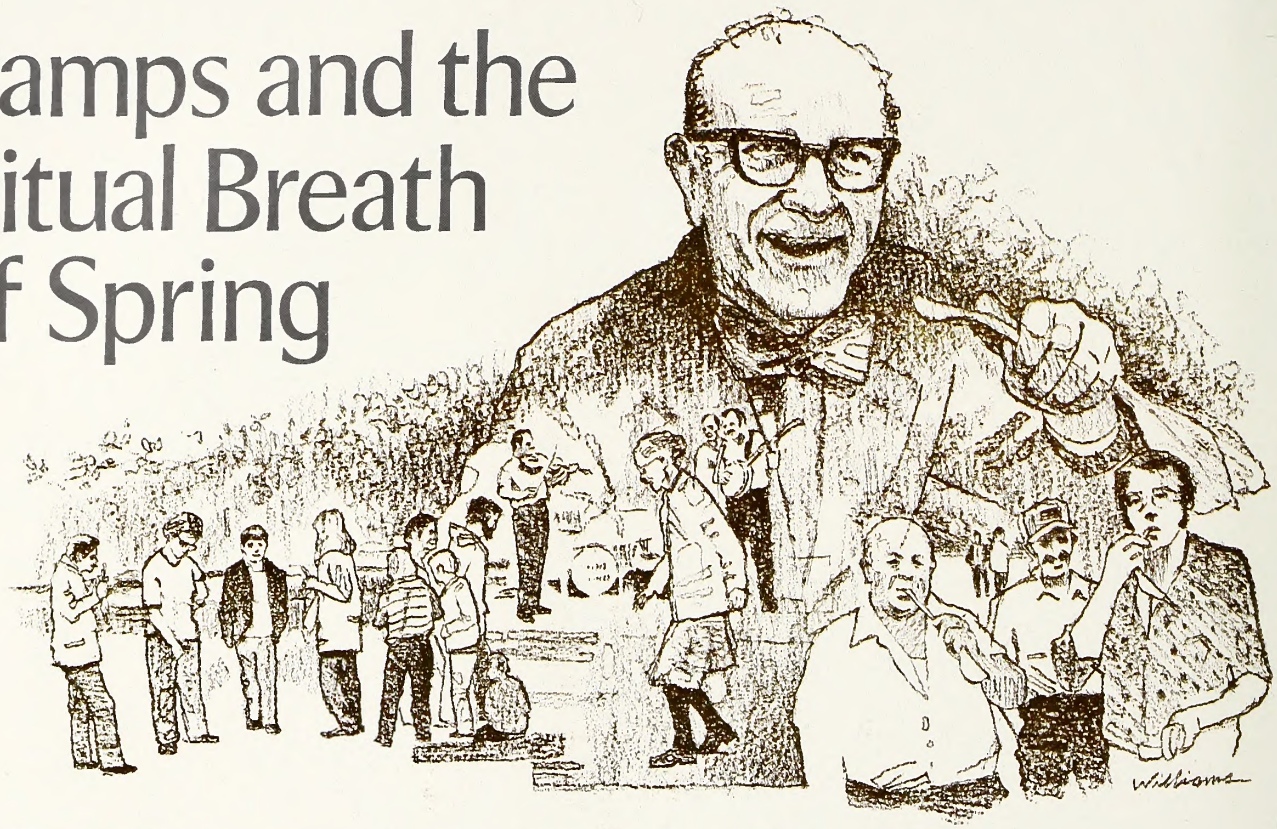


Ramps and the Ritual Breath of Spring



Behold the noble ramp, a fabled plant, steeped with the folklore of the Southern Appalachians and celebrated in annual rites of spring.

What, you may be asking, is a ramp? For the uninitiated, ramps are a wild species of uncommonly strong garlic found growing at high altitudes from Georgia north to New Brunswick and Minnesota. These broad-leafed plants *(Allium tricoccum)* often grow in beds in rich woods high in the mountains of western North Carolina and they are traditionally gathered in early spring before the leaves are fully expanded. At that time, the bulb is considered edible.

Whether ramps are actually edible gets to the root of the matter, so to speak. Indeed, during ramp gathering time, there are only two kinds of people in the hills — those who eat ramps and those who don't. There is no social interchange between the two groups.

Over the years, ramps have attracted an almost mystical allegiance. Ramp eating societies have been formed. There is a ramp festival in Waynesville each spring, and the popularity of this event has not escaped the keen eyes of politicians. To eat a ramp publicly is to garner votes. Some polls would say it beats, or at least replaces, kissing babies. Ramps have a flavor that is a cross between an onion and garlic, except more so. There is also a residual effect which might be called the aftermath — a condition that lasts anywhere from one to three days. Mainly, it is a ferocious and durable case of bad breath. One does not eat ramps and go courting.

Although the following quote is from a 1945 West Virginia newspaper, it might well have been written about North Carolina.

"The Ancient Order of Ramp and Side Meat Eaters of the Central West Virginia Ramp Association conducted its annual meeting at the Community Building Tuesday night, and true to advance predictions, the windows were wide open.

"There were ramps, cooked and uncooked, 12 bushels of them enjoyed by the clansmen. With the rare delicacy was consumed 75 pounds of bacon, 30 pounds of country butter, 75 pounds of corn dodger, 50 dried applie pies, 100 pounds of potatoes and 50 gallons of sassafras tea.

"The springlike atmosphere accompanying the annual rites was productive of odoriferous charms. Men came, they partook, and they breathed of ramps. Even yesterday, one could point out plainly an attending member..."

To dismiss the eating of ramps as merely ritualistic snobbery is a mistake. True, it is a sort of mountain macho thing, closely akin to running a 1955 Chevy full of steam whiskey from Trap Hill to Winston-Salem, but there's more here than glory. As a matter of fact, ramps are good, and anyone who likes either onions or garlic will doubtless be taken by their flavor. And contrary to popular belief, ramps are tasty throughout warm weather, not just in the spring.

Ramps are traditionally eaten with pork, and they are commonly included with scrambled eggs or brains. Any recipe calling for spring onions or garlic can make use of ramps, and of course, they can be eaten raw. A fresh ramp wrapped in a slice of country ham is an unforgettable treat, and with any luck at all, you can rejoin society within a fortnight.

By Jim Dean

WILDLIFE IN NORTH CAROLINA

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Around each bend we encountered something new on this near wilderness river.

Three Days On The

Below the lower falls of Weldon in Halifax County, the Roanoke River is hardly an inviting stretch of water to the casual observer. The waters are often murky and cut with dangerous looking currents which flow between high muddy banks. But this initial view of the river does not give an accurate picture of the 120 miles of water that flow east from Weldon to Albemarle Sound.

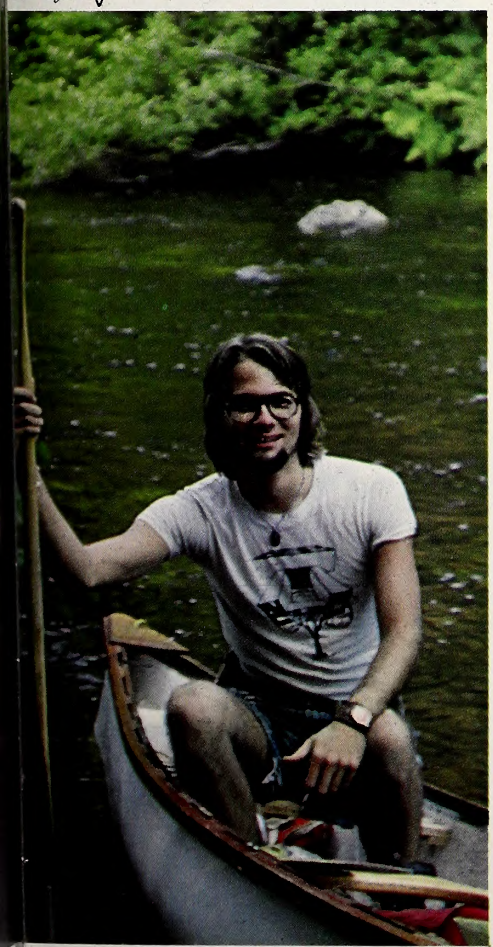
Last March, John Crawford and I took a three-day float down a 35-mile stretch of the Roanoke from the U. S. 258 bridge near Scotland Neck in Halifax County to the N. C. 11 bridge near Hamilton in Martin County. What we saw was a watery near wilderness rich in wildlife and history. More important, perhaps, for three days we left the deadlines of civilized life and drifted, cut loose from familiar routines. We saw a world few people see, and it gave us a renewed appreciation of our priceless, dwindling wild areas. Here is how it was.

We begin our trip on a chilly, pre-dawn, mid-March morning. Pushing off onto the dark, murky waters,

Roanoke

by J. Merrill Lynch

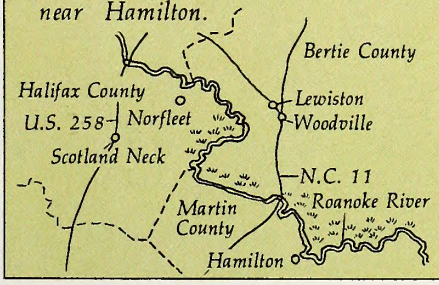
rill Lynch



The Roanoke River is often overlooked as a float stream, but it cuts a lonely swath through some remarkable country in northeastern North Carolina. High banks offer many suitable camping sites (above). Floating rivers is a hobby for amateur naturalist and author Merrill Lynch, shown below on another float trip; this one in Canada.

Roanoke Float Trip

The 35-mile float trip began near Scotland Neck at the U.S. 258 bridge, and wound its way down the meandering Roanoke to N.C. 11 near Hamilton.



the river current carries us silently, effortlessly downstream. Paddling is only necessary to keep the boat heading downstream. The river does all of the work. We have not floated a hundred yards when a turkey, gobbling from a stand of mature hardwoods on our left, breaks the pre-dawn silence. Straining to catch a glimpse of this magnificent bird in the gray light, we flush a pair of wood ducks from the stumpy shoreline. This was the first of 27 pairs we would see on our trip. With the turkey still gobbling behind us, we round the first bend.

Woods on both sides of the river are extensive; massive sycamores, hackberries, ashes, elms, and cottonwoods tower 100-150 feet above the ground. These large trees form a closed canopy which shades out most of the underbrush. The ground is remarkably clear; there are a few saplings or vine tangles which are characteristic of most cut-over woods. A lush growth of knee-deep grass forms a green bed over the ground.

By now the sun's rays are peeping through the trees, warming the cool air of the river valley. A pileated woodpecker suddenly appears as it flies across the river directly in front of our boat. It lands in a riverside sycamore, unaware or uncaring about our quiet approach. Its fire-red crest seems to glow in the early morning sunlight as it begins its search for carpenter ants, a favorite food.

This crow-sized bird, our largest native woodpecker, has been reduced in numbers across the state due to habitat destruction but is still a common sight along the Roanoke. Anyone who has never heard a pileated drumming has missed a real treat. It could easily be mistaken for a man hammering in the woods. Actually, each bird has several hollow, resonant trees within its territory which it uses as sounding boards to remind neighboring woodpeckers to stay out. Before our trip ended, we saw 43 of these magnificent birds.

A hawk appears, gliding low over the river. Its loud cry, slurred kee-yer, kee-yer, is repeated over and over. An echoing cry is heard from

over the treetops. His mate joins him to scold our intrusion in their territory. These are red-shouldered hawks, colorful birds having a rusty shoulder patch, rusty-red barring on the undersides, a black and white striped tail, and dark brown head and back. They are slightly smaller, than their cousin, the red-tailed hawk, which prefer less wooded areas. The red-shoulder has suffered with the pileated woodpecker as much of its bottomland habitat has been clear-cut or logged heavily during the past century. The ones we saw probably had a nest with eggs nearby. We saw 23 on our trip.

The sun is well up now and many of the smaller birds are busily searching for food. On the riverbank ahead of us, 20 black vultures scavenge for dead fish. They seem oblivious to our approach, and allow us to float within 30 yards before taking flight. These garbage-collectors of the bird world play a vital role in nature's scheme of things, helping to maintain a clean environment.

The grand forest along the river is a sight to behold. In this world of clear-cuts, even-age management, and tree farms, it is refreshing to see woods unchanged from the days of the pioneers or even the Tuscarora Indians, who used to roam this area. It is spring and the warm weather has enticed many of the trees to bud. Red maples in flower provide a colorful backdrop to the many shades of green. The leaves of the buckeye shrub are already fully developed, seeking the precious sunshine before the larger trees shade it out.

We float along, enjoying the tranquility of our surroundings. Shadows are getting longer as late afternoon approaches. A barred owl begins hooting from our right. Within seconds a second owl answers from our left. They continue their conversation as we round a sharp bend in the river. Just around the curve, we startle a great blue heron who has been fishing from a shoreline stump. With a deep croak, the heron flies downstream to continue his fishing undisturbed.

The warm day has brought a woodchuck out of his burrow to nibble on the tender grasses on the river levee. Alarmed by our close approach, he voices a loud, shrill whistle and scampers up the levee bank to the safety of his burrow. A woodchuck in the coastal plain? These supposedly mountain inhabiting rodents are numerous along the Roanoke, one of the places in the state outside the mountains where they are common. Why are they here and how did they get here? These are questions which have baffled state mammalogists. One theory is that they simply moved down the Roanoke Valley from its headquarters in the Blue Ridge. But why haven't they moved down other rivers too? No one knows for sure how the large rodents got here but many of the local farmers wish they hadn't made the trip! Their extensive burrows erode the levees along the river and their voracious appetites wreak havoc on spring crops. The range extension down the Roanoke has been very recent. Twenty years ago the woodchuck was unknown in the area.

We decide to make camp early so we can have some daylight left to explore. Finding a campsite is no problem as there are plenty of sites on the dry, well-drained floodplain. We choose an area in Bertie County in an ancient forest of massive trees. After setting up camp we decide to take a short hike through the woods. No sooner have we started, when two turkeys sprint ahead of us and disappear in the trees. After about five minutes, we reach a clearing — a corn stubble field. With darkness approaching we decide to wait just in case some deer come out to feed.

Sure enough, a group of 23 deer slip out of the woods one by one and begin feeding in the field. Apparently knowing they are safe, the deer pay no attention to our motionless bodies. We watch as they bound about in obvious play, chasing one another. Watching the deer in the twilight, a fairyland atmosphere envelopes us. I almost expect to see the white rabbit of Alice in Wonderland. It is a unique experience to watch these deer behaving in a natural, unafraid manner. It's like we are on equal terms with them, so different from the fleeting glimpses most of us have when we see deer run across the highway or when we flush them while hiking. To say the least, this was an experience John and I would never forget.

At sunrise the next morning, we get up to begin the second leg of our journey. Common and fish crows caw from the trees surrounding our campsite. They are announcing our presence to all the other creatures of the woods. We eat breakfast of grits and Tang, clean up camp, pack the boat, and push off once again.

The river enters a long straight course. In the distance, the river makes a sharp bend to the left. As we approach closer, we see a steep bluff rising at a sharp angle from the shoreline. It is an unexpected surprise. So far on our trip the river has flowed through a flat

floodplain; and now, suddenly, a bluff 75 - 80 feet high parallels the river on our right. Approaching closer, the bluffs loom taller and more impressive — details emerge. As our boat nears the base of the bluff we notice shells protruding from a bank of bluish clay marl. An amazing assortment of thousands of ancient fossilized seashells lies before us — oysters, clams, scallops the size of small dishes, barnacles, corals, and a host of others less familiar. This is an exposed marl bed which, according to geologists, is the remains of ocean sediments deposited during the Miocene Age 15 to 25 million years ago.

The remainder of the bluff overlying this marl bed is composed of yellowish sands deposited about three million years ago during the Pleistocene Age when the ocean once again covered what is now the Coastal Plain. These bluffs mark the location of an ancient shoreline; they were formed when the sea level rapidly receded. The layers of the bluff represent chapters in an unfolding book of geological history.

These bluffs, as well as being unique geologically, also harbor an interesting variety of mountainous and lowland plants. Covering the steep slopes are the blooms of trout lilies, trailing arbutus, wild ginger, bloodroot and saxifrage growing side by side with festoons of Spanish moss and massive cypress trees. Many of the larger limbs are adorned with resurrection fern — a unique fern in that it almost never grows in soil. It derives its name from the fact that in dry weather the fronds shrivel and appear lifeless. But after a rain the fern "resurrects," the shriveled fronds turning bright green.

Suddenly we realize that it is late afternoon. We have been so absorbed with our surroundings that we have lost all track of time. We pick a campsite which is situated on the south bank directly underneath a steep bluff covered with dense thickets of mountain laurel. A deeply eroded ravine containing a fast-flowing freshet is nearby. The steep slopes above us are covered with a virtual blanket of wildflowers. Our campsite is on the edge of a natural herb garden! We spend the remaining hours of daylight exploring the ravine and the bluff until it is too dark to see. Under the cloak of darkness we remember we are hungry! Using a sterno-fueled stove we fix a simple but appetizing meal. We now prepare a batch of hot sassafras tea from roots that we have gathered from around the campsite. Sitting around the glowing fire, content, we reflect upon the day's events while we listen to the sounds of the night.

Surrounded by an orchestra of barred owls, spring peepers, and tree frogs, we crawl into our sleeping bags and fall into a deep, satisfying sleep. Waking to the chatter of gray squirrels, and a band of chickadees noisily inspecting our camp, we eat, pack up, and begin the final leg of our journey.

Around the next bend, our destination looms before us. The highway bridge is just ahead, and we suddenly realize that this is the end of our trip. We paddle to the bank and pull the boat up the steep bank to the waiting car.

The three-day trip was a learning experience for both of us. Around each bend of the river we encountered something new, something different. We watched the intricate processes of nature and its inhabitants on their terms, not ours. Our senses, dulled by the staleness of urban existence, reacted to the varied sights, sounds and smells around us. This was a world free of concrete, asphalt, cars, and other man-made eyesores; a world that is rapidly being replaced by urban sprawl — bulldozed away forever as living space becomes tighter and tighter. Can we afford to lose these precious vestiges of our natural heritage? Come and visit the Roanoke wilderness and decide for yourself.

Those who wish to duplicate our Roanoke River float will need maps. We purchased county road maps which showed an adequate amount of detail from the N.C. Department of Transportation for 15 cents each, and supplemented them with topographic maps which can be bought for $1.50 each from the Distribution Section, Geological Survey, 1200 S. Eads Street, Arlington, Va. 22202. Write for an index to be sure to pick the proper quadrangles.

We used a 10-foot aluminum johnboat, but a larger johnboat or a canoe would be practical. We left one car at the N.C. 11 bridge near Hamilton for the return trip.

Our list of equipment included: sleeping bags, lightweight nylon tent, plastic groundsheet, foam sleeping pads, two waterproof flashlights, binoculars and camera packed in waterproof plastic bags, life preservers and extra paddles, ponchos, insect repellent, portable stove and fuel, dehydrated and canned foods and water, fishing gear, and personal clothing.

Fossil shells estimated at 15 to 25 million years old are common at certain spots in high clay banks along the Roanoke River (below). Wildlife species, such as the pileated woodpecker (far left) are very common along the river.

ll Lynch

J. Merrill Lynch is a senior at N.C. State University majoring in conservation. He is a native of Roanoke Rapids, N.C.

Endangered Plants of North Carolina

The Wildlife Commission's program dealing with endangered species was described in the July 1977 issue of *Wildlife in North Carolina*. The program thus far deals only with those species declared to be endangered by the U.S. Fish and Wildlife Service. Although the federal Endangered Species Act of 1973 (Public Law 93-205) does include plants, no plant species yet has been officially designated. Furthermore, the Service has found that it was not the intent of the Act to fund state programs related to endangered plant species. As a result, all work to be done in this area will be conducted by or under the supervision of the U.S. Fish & Wildlife Service until the Act is amended to provide for funding state programs.

The designations "endangered" and "threatened" imply different degrees of threat to continued existence. An endangered species is one which is in immediate danger of extinction or extirpation because of loss of habitat, exploitation, disease, or other reasons due to man's activities or natural conditions. A threatened species is likely to become endangered within the foreseeable future. The federal listings will, in all likelihood, include only the endangered species. However, we need to be aware of those in a threatened category, and take appropriate measures to guard against their decline.

Spreading avens (Geum radiatum), *an endangered plant of the southern Appalachians, is found only on the rocky balds at very high elevations in five North Carolina Counties.*

In anticipation of federal and state laws and research programs eventually including plants, many states now have lists of rare species considered to be endangered or threatened. In 1975, a committee of the N.C. State Museum of Natural History[1] developed a list of 91 endangered and threatened vascular plants of primary concern. These 91 species include four categories.

1) *Extinct or extirpated:* An extinct species is one which is no longer known to exist in North Carolina or elsewhere. An example is bigleaf scurf pea collected in 1897 in Polk County and not seen since that time. An extirpated species is no longer found in North Carolina but still occurs elsewhere. For example, sweet gale did occur in Henderson County up until a few years ago as a disjunct from its normal range from Pennsylvania northward but the North Carolina habitat in which it occurred has since been destroyed. There are six species in North Carolina considered to be extinct or extirpated.

2) *Endemic:* An endemic species, for our purposes, is one which has its native area totally confined to a region of North Carolina and possibly adjacent areas of neighboring states. These species exist here and no where else in the world except possibly under cultivation. Examples are Cooley's meadowrue known only from the southeastern corner of the state, Venus' fly-trap found only in the southeast and in two or three counties of South Carolina, and spreading avens, a Southern Appalachian endemic, occurring only in the mountains of North Carolina and eastern Tennessee. Although not all endemics are rare, 24 are considered as either endangered or threatened.

3) *Endangered and Threatened throughout:* These species have a broader distribution, sometimes over several states, but are rare and considered endangered or threatened throughout their entire geographical range. Forty five are in this category. An example is the small whorled pogonia, known from New England west to Missouri and south to North Carolina, but one of the rarest orchids in the United States and considered endangered throughout.

These first three categories would normally include the species recognized on a federal list since they would be either endangered or threatened in terms of the entire United States. To this extent then, the North Carolina and federal lists should be very similar. The next categories, disjuncts and peripherals, would be recognized by the individual states only and the species would have no federal status.

4) *Disjuncts:* A long-range disjunct in North Carolina is a

by James W. Hardin

segment of a species population which is separated by a few hundred miles or more from the main area of distribution. There are 16 rare disjuncts in our state. For example, Wright's cliffbrake fern, found in two counties of the North Carolina Piedmont, is nearly 1000 miles east of its normal range in southwestern United States. Such disjunct populations often represent a significant relict of past geological times, and usually mark a unique and interesting habitat within our state. It is important that these disjunct populations be preserved as a unique element in our state flora.

These 91 species listed here represent only 2.7 percent of the approximately 3400 species of vascular plants in North Carolina. Although relatively few of these 91 are known by the general public because of their rarity[2], there is deep concern for their preservation. The specific habitats that contain these rare plants need to be preserved and managed to insure their continued survival. Commercial exploitation of the very attractive or economically important species should turn entirely to greenhouse or nursery-grown plants rather than digging them from natural habitats. "Backyard gardeners" will have to show their concern by leaving them alone rather than selfishly attempting to transplant them into their own gardens and yards where they seldom survive.

The North Carolina Committee has also recognized a second list[3] of 319 *peripheral* species which are rare and either endangered or threatened. Peripheral species may be fairly common either north, west, or south of us, but rare at the terminus of their distribution in North Carolina. An example is the palmetto palm which, although common southward, is a rare and unique tree in the forests of Smith Island and the extreme southeastern coast. Although frequent elsewhere, one should argue that these native peripheral species represent an integral part of the North Carolina flora, that we are the "keepers" of this one important segment of the entire range, and possibly a significant element of the total genetic diversity of the species, and that they should be included in any state legislation dealing with the protection of rare species. Their elimination here would certainly represent a loss in terms of the natural plant diversity of our state. These peripheral species, plus the 91 of primary concern, total 410 rare species of native vascular plants, representing only 12 percent of the vascular flora.

Gray's lily (Lilium grayi) *is threatened throughout its range. This mountain lily is rare and is currently being exploited commercially and privately for gardens.*

Plants in general form a vital segment of life around us. The obvious functions of shade trees, food crops, lumber-producing trees, and such, have never been doubted. It is perhaps an unfortunate characteristic of our sophisticated society, that we must see material value in anything before we are ready to make any effort to come to its aid.

In the case of many of the rare and endangered plants described here, and additional ones found in low numbers elsewhere, no such obvious "use" or "value" is apparent. And it may be that we are reluctant to take any but meager steps to protect our endangered plants.

Yet, once individual plant species are ultimately gone, eliminated to the very last plant, there is no possibility of "reconstructing" or resurrecting it ever again.

If we must place some sort of material value on a plant (or animal) species before we are wise enough to take action for its restoration and preservation, review, if you will, the plants that have given rise to medicinal remedies that prevail even today —digitalis, for example, a powerful cardiac stimulant made from the dried leaves of of the common foxglove plant. What undiscovered vital medicines are locked in plants yet to be recognized? Is there a life-saving drug dormant in one of our endangered plants?

Even in our era of technology, plants serve a multitude of uses, many unduplicated in man-made synthetics. It is not unrealistic to presume obscure plants still hold secrets of great value to mankind, now and in the future. But what if the plants are gone before such discovery?

If such reasoning does not move us to action in the direction of plant preservation, perhaps the re-discovery of simple beauty in nature will stimulate such a response.

North Carolina is fortunate to have a rich and varied flora. Hopefully, the citizens of our state, with the help of federal and state programs dealing with natural areas and endangered species, can be effective in preserving this significant part of our natural heritage. Extinction of animals and plants will continue not only through natural phenomena but at a much faster pace through the reckless ways of man. It will only be by the efforts of all that we can maintain most of the great diversity in nature.

Dr. James W. Hardin is Professor of Botany, Botany Department, N.C. State University at Raleigh.

North Carolina's Endangered Plants

Some are gone forever (extinct or removed); others are confined to North Carolina (endemic) but are endangered; many are threatened throughout their range; and several are here, but are way out of their normal range (disjuncts) and thus are rare.

EXTINCT or EXTIRPATED

Astilbe crenatiloba	Roan false goat's-beard (Ext.)
Cardamine micranthera	Small-anthered bittercress (Ext.)
Gale palustris	Sweet gale (Ex'd.)
Lindernia saxicola	Rock false pimpernel (Ext.)
Psoralia macrophylla	Bigleaf scurfpea (Ext.)
Solidago porteri	Porter's goldenrod (Ext.)

ENDEMICS Endangered or Threatened

Cacalia rugelia	Rugel's ragwort (E)
Carex misera	Wretched sedge (E)
Carex purpurifera	Purple sedge (E)
Coreopsis latifolia	Broadleaf coreopsis (E)
Dionaea muscipula	Venus' fly-trap (T)
Geum geniculatum	Bent avens (E)
Geum radiatum	Spreading avens (E)
Glyceria nubigena	Smoky-mountain mannagrass (E)
Helianthus schweinitzii	Schweinitz' sunflower (T)
Hexastylis lewisii	Lewis' heart leaf (T)
Hexastylis naniflora	Dwarf-flowered heart leaf (E)
Hudsonia montana	Mountain golden heather (E)
Kalmia cuneata	White wicky (E)
Lysimachia asperulaefolia	Rough-leaf loosestrife (E)
Pyxidanthera barbulata var. *brevifolia*	Wells' pyxie-moss (E)
Ranunculus subcordatus	Bladen buttercup (E)
Rhododendron vaseyi	Pink-shell azalea (T)
Sagittaria fasciculata	Bunched arrowhead (E)
Scirpus flaccidifolius	Reclining bulrush (E)
Shortia galacifolia	Oconee bells (E)
Solidago pulchra	Carolina goldenrod (E)
Solidago spithamaea	Blue-ridge goldenrod (E)
Solidago verna	Spring-flowering goldenrod (E)
Thalictrum cooleyi	Cooley's meadowrue (E)

THROUGHOUT Endangered or Threatened

Arenaria godfreyi	Godfrey's sandwort (E)
Arenaria uniflora	Single-flowered sandwort (E)
Asplenium heteroresiliens	Carolina spleenwort fern (E)
Buckleya distichophylla	Piratebush (E)
Calamovilfa brevipilis	Riverbank sandreed (T)
Carex biltmoreana	Biltmore sedge (E)
Carex chapmanii	Chapman's sedge (T)
Cladrastis lutea	Yellowwood (T)
Cymophyllus fraseri	Fraser's sedge (T)
Diervilla rivularis	Georgia bush-honeysuckle (T)
Echinacea laevigata	Smooth coneflower (T)
Habenaria flava	Southern rein orchid (T)
Habenaria integra	Yellow fringeless-orchid (T)
Habenaria peramoena	Purple fringeless-orchid (T)
Helonias bullata	Swamp-pink (T)
Hexastylis contracta	Mountain heart leaf (E)
Hydrastis canadensis	Goldenseal (T)
Ilex amelanchier	Sarvis holly (T)
Isoetes piedmontana	Piedmont quillwort (T)
Isotria medeoloides	Small whorled pogonia (E)
Liatris helleri	Heller's gayfeather (T)
Lilaeopsis carolinensis	Carolina lilaeopsis (E)
Lilium grayi	Gray's lily (T)
Lindera melissaefolia	Southern spicebush (E)
Myriophyllum laxum	Loose watermilfoil (T)
Narthecium americanum	Bog asphodel (T)
Nestronia umbellula	Nestronia (T)
Panax quinquefolium	Ginseng (T)
Plantago cordata	Heart-leaf plantain (E)
Portulaca smallii	Small's portulaca (E)
Prenanthes roanensis	Roan rattlesnakeroot (T)
Ptilimnium fluviatile	Stream mockbishopweed (T)
Rhododendron bakeri	Cumberland azalea (T)
Rhus michauxii	Michaux sumac (T)
Rudbeckia heliopsidis	Sun-facing coneflower (T)
Sarracenia rubra	Sweet pitcher-plant (T)
Saxifraga careyana	Carey saxifrage (T)
Saxifraga caroliniana	Carolina saxifrage (E)
Schisandra glabra	Magnoliavine (T)
Sedum pusillum	Puck's orpine (E)
Senecio millefolium	Divided-leaf groundsel (E)
Sporobolus teretifolius	Wireleaf dropsead (T)
Synandra hispidula	Synandra (T)
Trillium pussilum var. *pusillum*	Carolina trillium (T)
Utricularia olivacea	Dwarf bladderwort (T)

DISJUNCTS Endangered or Threatened

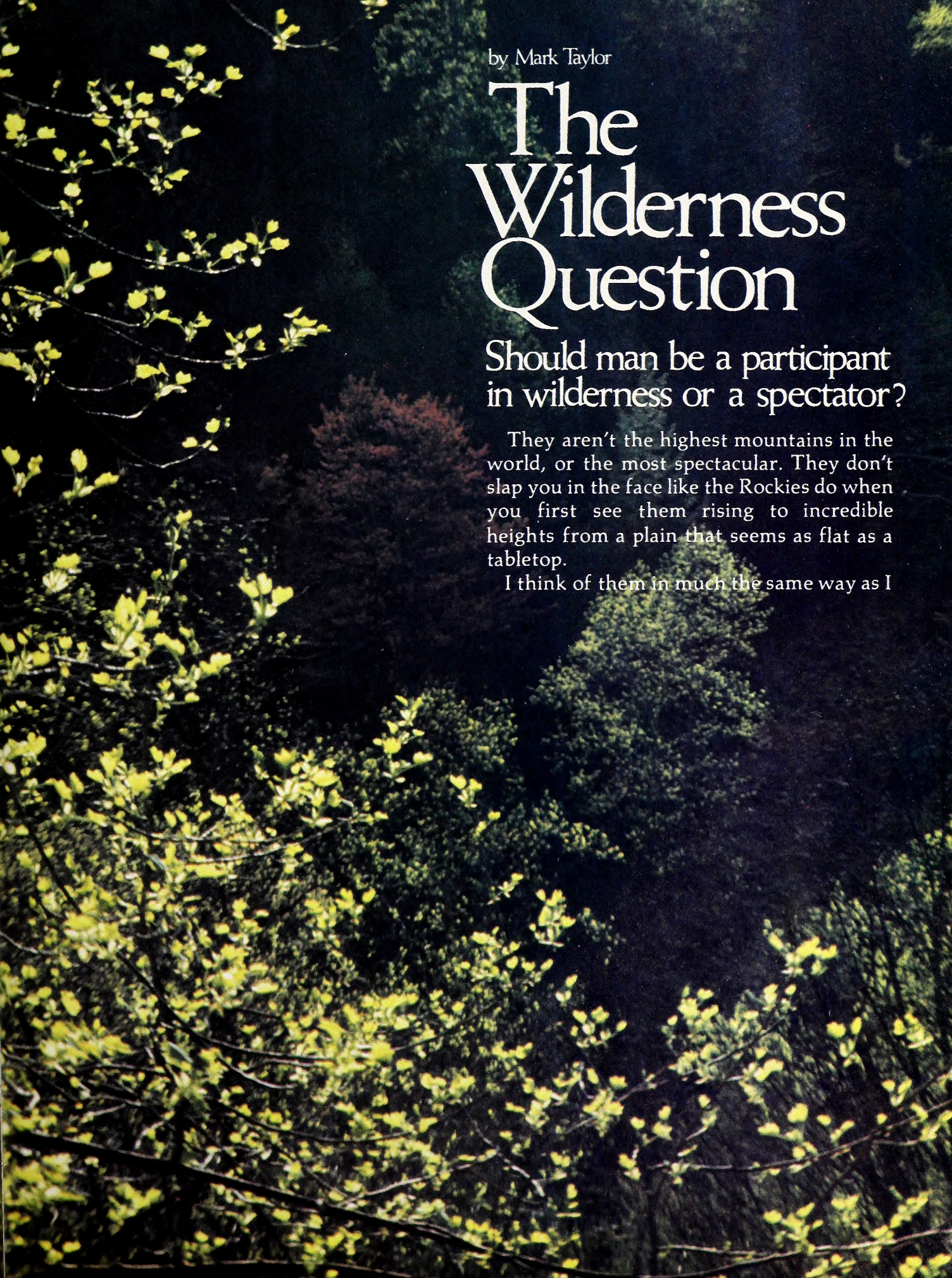
Asplenium monanthes	Single-sorus spleenwort (E)
Betula cordifolia	Mountain paper birch (E)
Calamagrostis porteri	Porter's reedgrass (T)
Carex aenea	Fernald hay sedge (E)
Cystopteris X tennesseensis	Tennessee bladder fern (E)
Dalibarda repens	Robin-run-away (E)
Erocaulon lineare	Linear pipewort (T)
Eupatorium resinosum	Resinous joe-pie-weed (T)
Grammitis nimbata	Dwarf popypody fern (E)
Juncus trifidus var. *monanthos*	One-flowered rush (E)
Listera cordata	Heart-leaved twayblade (E)
Pellaea X wrightiana	Wright's cliff-brake fern (E)
Poa languida	Torrey bluegrass (E)
Sedum rosea	Roseroot (E)
Sporobolus heterolepis	Prairie dropseed (E)
Trisetum spicatum	Soft trisetum (E)

[1]Plant committee: J.W. Hardin, NCSU (Chr.); R.L. Kologiski, NCSU; J.R. Massey, UNC-CH; J.F. Matthews, UNC-C; J.D. Pittillo, WCU; A.E. Radford, UNC-CH.

[2]These 91 species are described and many illustrated in: "Endangered and Threatened Plants and Animals of North Carolina." N.C. State Museum of Natural History. Raleigh, N.C. 1977.

[3]ibid.

Douglas Elliott>



by Mark Taylor

The Wilderness Question

Should man be a participant in wilderness or a spectator?

They aren't the highest mountains in the world, or the most spectacular. They don't slap you in the face like the Rockies do when you first see them rising to incredible heights from a plain that seems as flat as a tabletop.

I think of them in much the same way as I

think of my favorite wool hunting jacket. Old. Comfortable. Frayed around the edges. In the New Hampshire hills where I grew up, the second highest peak in the east, Mount Washington, was visible from the end of my street. Up North, the Appalachians bear the scars of time. Walk the granite ridges, and on smooth slabs of rock you'll see scratches in the stone that look as if someone had dragged a rake over a smooth patch of dirt. A glacier a mile thick made a mighty fine rake. Try to farm the rounded valleys between the hills, scooped out by the last glacier, and you'll be fighting rocks for the rest of your life. Glaciers didn't believe in packing out what they packed in.

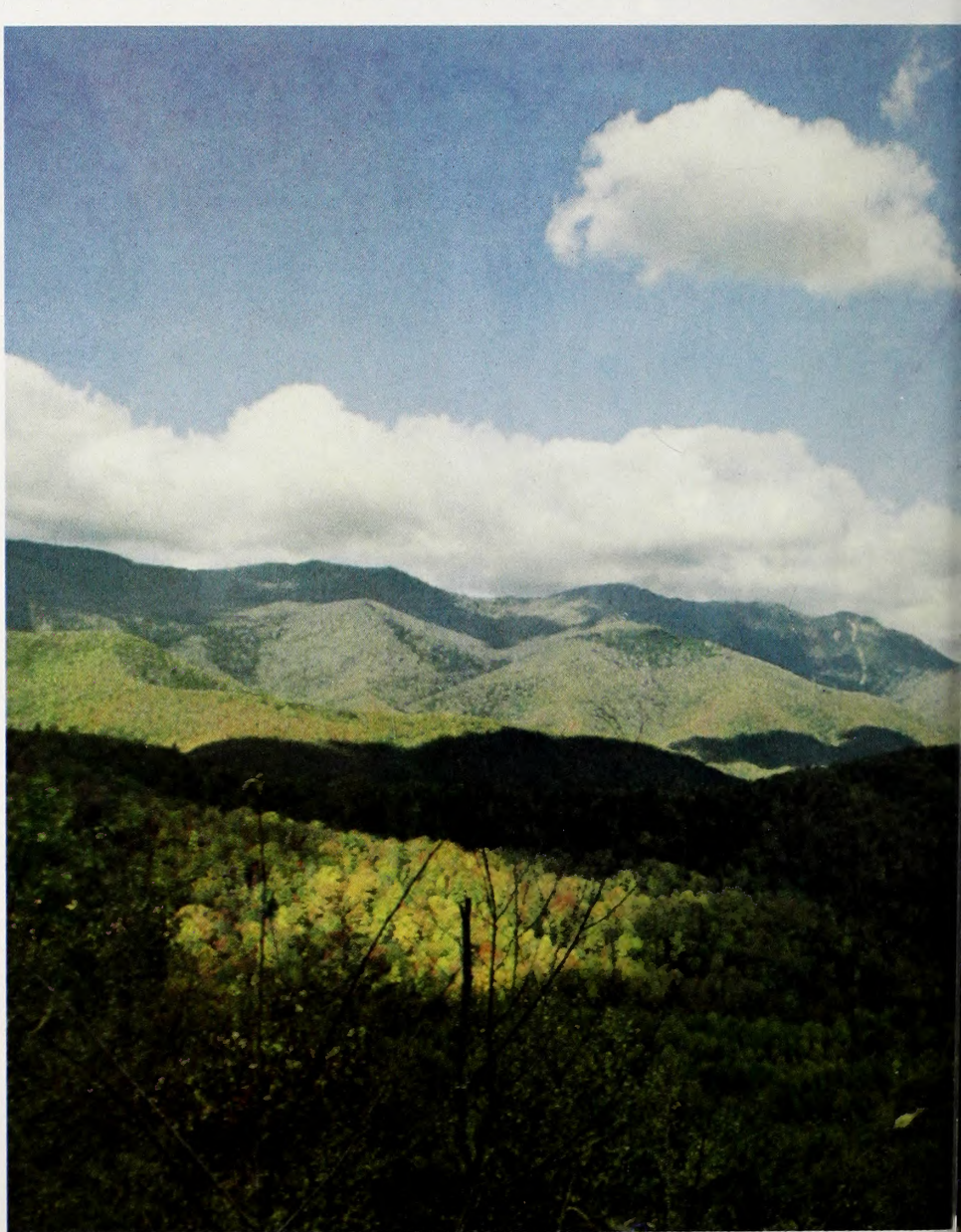
In the hills of western North Carolina, the Appalachians are much the same. The hills are steeper and the valleys narrower because the glaciers never made it south of central Pennsylvania. But the trees are the same: beech, maple, oak, and other hardwoods on the sides of the ridges, dog-hair thickets of spruce-fir on top. Driving into the mountains of North Carolina is a lot like slipping into my favorite wool jacket. It's like coming home again.

If Daniel Boone were to awake from a 200-year nap today, a la Rip Van Winkle, in his old stomping grounds in western North Carolina, he would find much of the mountains nearly the same as they were 200 years ago. For a goodly percentage of the mountains is managed by two Federal agencies, the U.S. Forest Service and the National Park Service, and much of it is managed as wilderness.

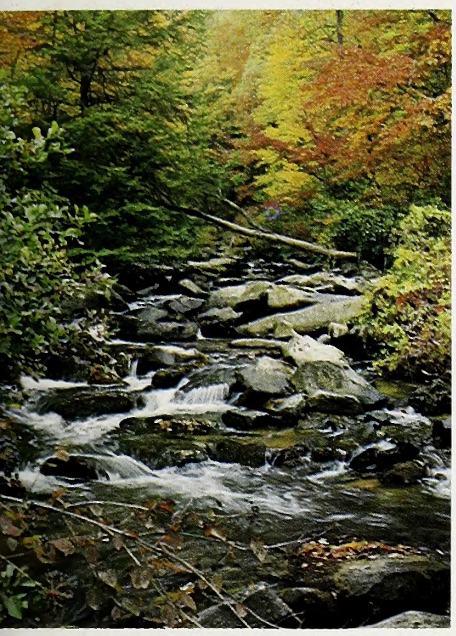
Presently, the two agencies manage about 600,000 acres of wilderness or "primitive" areas in North Carolina. The Park Service has 390,500 acres of proposed "wilderness" land in the Great Smoky Mountains National Park, which is roughly 85 percent of the park's area. The Forest Service manages about 180,000 acres of "road-less" or "undeveloped" land in the mountains. An additional 36,240 acres of Forest Service land in the mountains is also classified as "wilderness." Although the terminology for the classifications is the same for both agencies, management practices vary widely, due to the nature of the agencies themselves. Let's take a look at the policies of the

Wilderness Areas of North Carolina

Wilderness locations are shown in a general way on this map. For a more detailed map of specific roadless and wilderness areas, write National Forests in North Carolina, Box 2750, Asheville, N.C. 28802.



Ken Taylor



N.C. Travel and Tourism/ Clay Nolen

High mountain streams in the Smokies are some of the last holdouts for the Appalachian Brook Trout. The Appalachian Brookies are thought by some to be a separate species of fish from the common brook trout, and is in danger of being extirpated from some streams by rainbow and brown trout, which are competing for its habitat.

two bodies, and see how they affect North Carolina's wildlife and its sportsmen.

To understand the differences in management policies between the Forest Service and the Park Service, it is necessary to understand the management philosophies held by each agency. Basically, the difference is very simple. The Park Service holds a preservationist philosophy towards managing our resources while the Forest Service is devoted to the multiple use and the utilization of our natural resources.

"Our philosophy in managing the natural areas of the Smokies is to preserve ecosystems in a condition approximating as nearly as possible the way it would have been without interference by modern man," Boyd Evison, Superintendent of the Great Smoky Mountains National Park commented. "Modern European man has concentrated his effects on the environment. By using our gift of intelligence, we should be able to see the scientific and aesthetic value of leaving some areas untouched, so that we have a point of reference to measure our effects on the environment against."

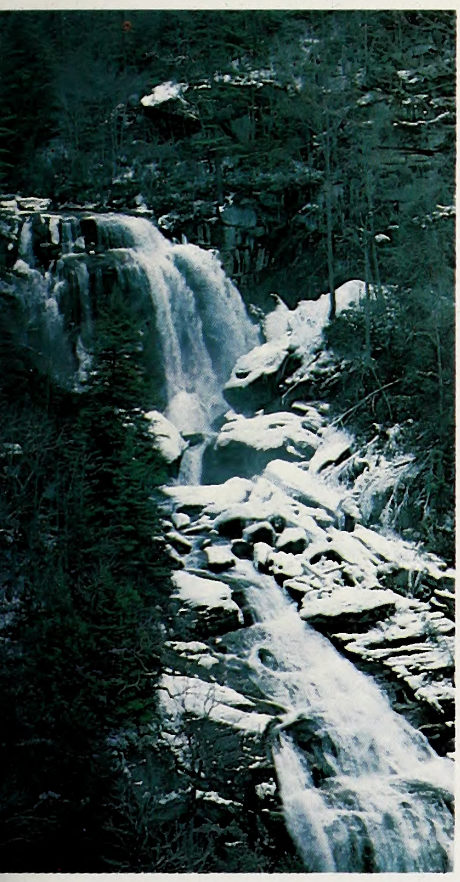
On the other hand, the Forest Service is obligated to manage for multiple use of our forests. This includes using the land for recreation, timber production, grazing, wildlife and as a water source.

"The big difference between our philosophies in wildlife management is that the park is managing for the individual organism, while we're managing populations," commented Ben Sanders, a biologist for the U.S. Forest Service. "In terms of the species you'll have in either area, they'll be about the same. The big difference is in the populations of the animals. By using certain wildlife management techniques, we can vastly increase the carrying capacity of the land for whatever species of wildlife we're managing for."

The Park Service's wildlife management is relatively simple, just let everything alone except when trying to return ecosystems to a natural state. No timber cutting, prescribed burns, or wildlife plantings are allowed in the park. Taking any live organisms out of the park, except for certain plants and fish, is illegal. In contrast, the Forest Service conducts a sophisticated wildlife management program.

"In 1971, the Forest Service went to what we call a Featured Species Plan for wildlife throughout National Forests in the southeast," Sanders commented. "Under this program we break the forest up into management units, evaluate the habitat, and using other factors, decide what 'featured species' we're going to manage for that tract."

A typical management unit might be Barker Creek on the Nantahala



Ken Taylor

National Forest. A survey was made of the area, and the forest was found to be 64 percent mixed hardwood, most of it between 10 to 40 years old. Slope, browse, water, sportsmen interest, wildlife and plant species, accessibility and evaluation are all included in the survey. By using this information and finding out what species people are interested in for a particular area, the featured species are picked and all management in that area is tailored accordingly. On the Barker Creek Unit, bear, wild boar, wild turkey and trout were selected as the featured species.

Hiking is one of the primary sports enjoyed in the mountains, and some trails have had to be paved because of heavy use. Winter hiking is growing in popularity, and minimizes the impact of use on the land. Anyone backpacking in the mountains in winter should carry adequate supplies and equipment, as weather conditions can change for the worse very fast.

Whitewater Falls in the Pisgah National Forest is one of many scenic waterfalls in the Appalachians of North Carolina. To minimize wear and tear of the land, both the Park Service and the Forest Service are now trying to promote some of the less popular attractions in the mountains.

is W. Gunter

Ken Taylor

"What we'd do on the Barker Creek Unit is to tailor our management to suit these particular species best," Sanders explained. "For example, bear like a mature forest, so our timber cutting would be on a much longer rotation than it would be ordinarily, say over 100 years between cuttings. Another thing we might do is to locate the large old snags that make den trees, and those wouldn't be included in any cuts. Bear are about the hardest species to manage for, they need very old forest and they don't like to be disturbed, so access would be available, but limited. Now if we were managing for deer, we'd have cuttings on a much shorter rotation, so that we'd have a lot of browse within reach all of the time."

"The key to having a good diverse population of various wildlife species is to offer them a lot of variety," Sanders continued. "We try to offer them everything from bare ground, to open fields, to immature and mature forests in the same general area. And it's worked well for us."

Clearcutting in small patches is generally beneficial to wildlife, and is referred to as "even-age management," because it puts all of the trees in a given area in the same age class. The Forest Service cuts are generally between six and 25 acres in size. Originally, foresters removed trees selectively, perhaps taking out an oak or hickory and hoping one would come back in its place. Often they didn't because these trees are shade intolerant, and a less desirable species for wildlife would take their place. This is why wildlife biologists and foresters recommend moving to even-age management, which also is more efficient and less costly to log and manage.

In contrast, the policy practiced by the Park Service is very good for some animals, while it supports low populations of others. Bear do very well in the Smokies because they are a wilderness species that thrive in isolated mature forests where many of the trees are 300 to 400 years old. An animal like a deer, which feeds on the browse of low-lying shrubs, will do better where there are clearings and cut-over areas going to brush. The growth in the tops of mature trees does very little good to animals that can't get to it.

"We've got between 400 and 600 bears in the park now, which is a fairly large stable population," Evison commented. "Some are taken by poachers from outside the park, or by poachers who'll drive into the park at night, drop a female with cubs, then take the cubs and sell them to roadside zoos. Sometimes when we have problem bears, we live trap them and give them to states who are trying to restore bear to areas where they've been eliminated."

Problem bears are something the Smokies have, which the Forest Service does not. Because the bears in the park aren't hunted and are often fed by park visitors, despite strong rules outlawing the practice, many of the bears in the park have lost their fear of man.

"We've had people scratched and bitten by bears, but haven't yet had anyone seriously injured," Evison said. "In the past the Park Service used to encourage people to feed the bears because it pleased the visitors, now we're dead set against it. They're very dangerous animals, and shouldn't be trifled with. In the back country, some of the bears have learned that if they charge a hiker he'll often drop his pack and run, giving the bear a free meal. We try to live trap animals like that and move them to more remote areas where there's fewer people. If they continue to do it, they're removed from the park and given to a state for bear restoration work. We haven't had any serious injuries yet, but it could happen. A black bear killed someone in Michigan; although eastern bears are usually less aggressive than western bears. I've seen people do some incredibly foolish things with the animals. One woman smeared honey on her child's cheek so she could get a picture of the bear 'kissing' her kid."

The two agencies also have different policies toward "exotic" species of wildlife, animals which weren't native to the area to start with. The Forest Service tolerates the presence of these species, while the Park Service, in most cases, seeks to eliminate them.

The focus of the controversy over exotic species in the mountains is the European wild boar. These animals were introduced into the mountains about 1910, at a private hunting club. In 1920, these boar broke during that time the boar had broken out of their enclosure and spread onto adjacent lands. Since then they have spread through much of the mountains, including most of the Great Smoky Mountains National Park, and have become a much sought after game animal.

Jim Dean

Ken Taylor

Polygala (purple) and buttercups are just two of the beautiful wildflowers you will find in the mature forests of the Appalachians. Many of the mountain wildflowers grow well in deep shade and moist acidic soil, and will not withstand much interference by man.

The Lynx Spider is one of the many insects found in the mountains. In the National Park System, all organisms are protected and except for limited fishing, no organism can be removed from the park.

The Black Bear needs large blocks of mature forests to thrive. The bears have done very well in the Great Smoky Mountains National Park, although poaching along the borders and within the park itself is a problem.

Ken Taylor

Mark Tayl

"Our policy on exotics is if they're damaging or endangering native plant or animal communities, they should be removed whether people like them or not," Evison said. "The boars do a lot of damage, they wallow in the headwaters of streams often raising the coliform bacteria count to the point where it's unsafe to drink the water, and in places on top of the ridges there are spots where they've rooted around that look as if the land has been plowed and harrowed. They're destroying some of our plant communities and eating certain rare salamanders and terrestrial snails, so they've got to go."

On the other hand, the National Park does permit the presence of rainbow and brown trout, both of which are non-native species.

"In a sense, there's a dichotomy between the fish situation and the boar situation here," Evison said. "Fish are a lot easier to control than the pigs are, and where we think the exotic trout are displacing the native brook trout, we're taking steps to protect the brookies. We might do this by placing barriers in the stream to prevent the exotics from expanding into the brook trout's range, or by removing the exotics from the water. In a sense we're doing that by allowing fishing for rainbow and brown trout, while we're giving the native brook trout total protection."

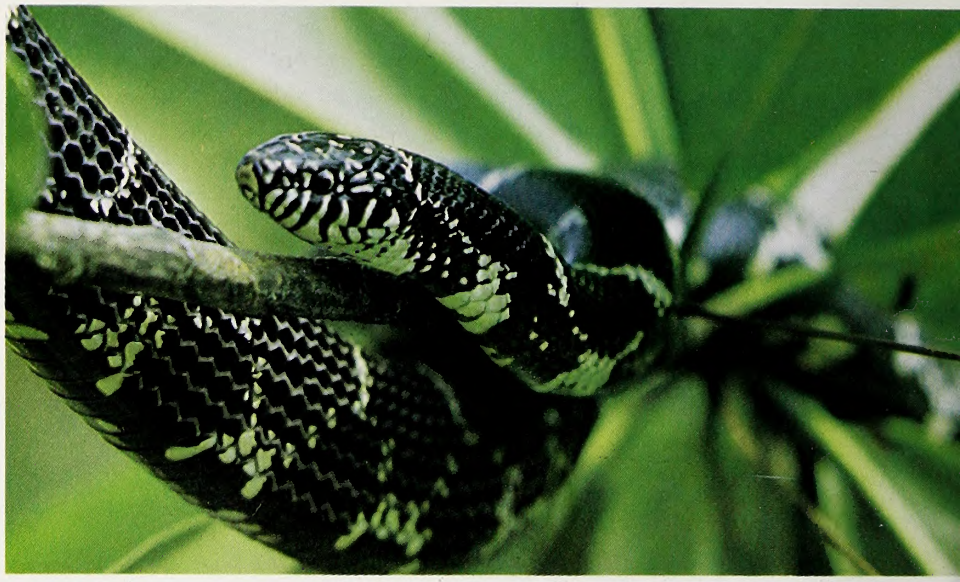
The Forest Service takes a less hard-line approach to exotics.

"We'd always give a native species priority over an exotic," Sanders said. "But where the exotic is established and not doing a great amount of harm, we'll let them stay. Also, we aren't opposed to the introduction of exotic species, provided that the situation has been thoroughly studied and we know that they won't damage an existing species or alter an ecosystem for the worse."

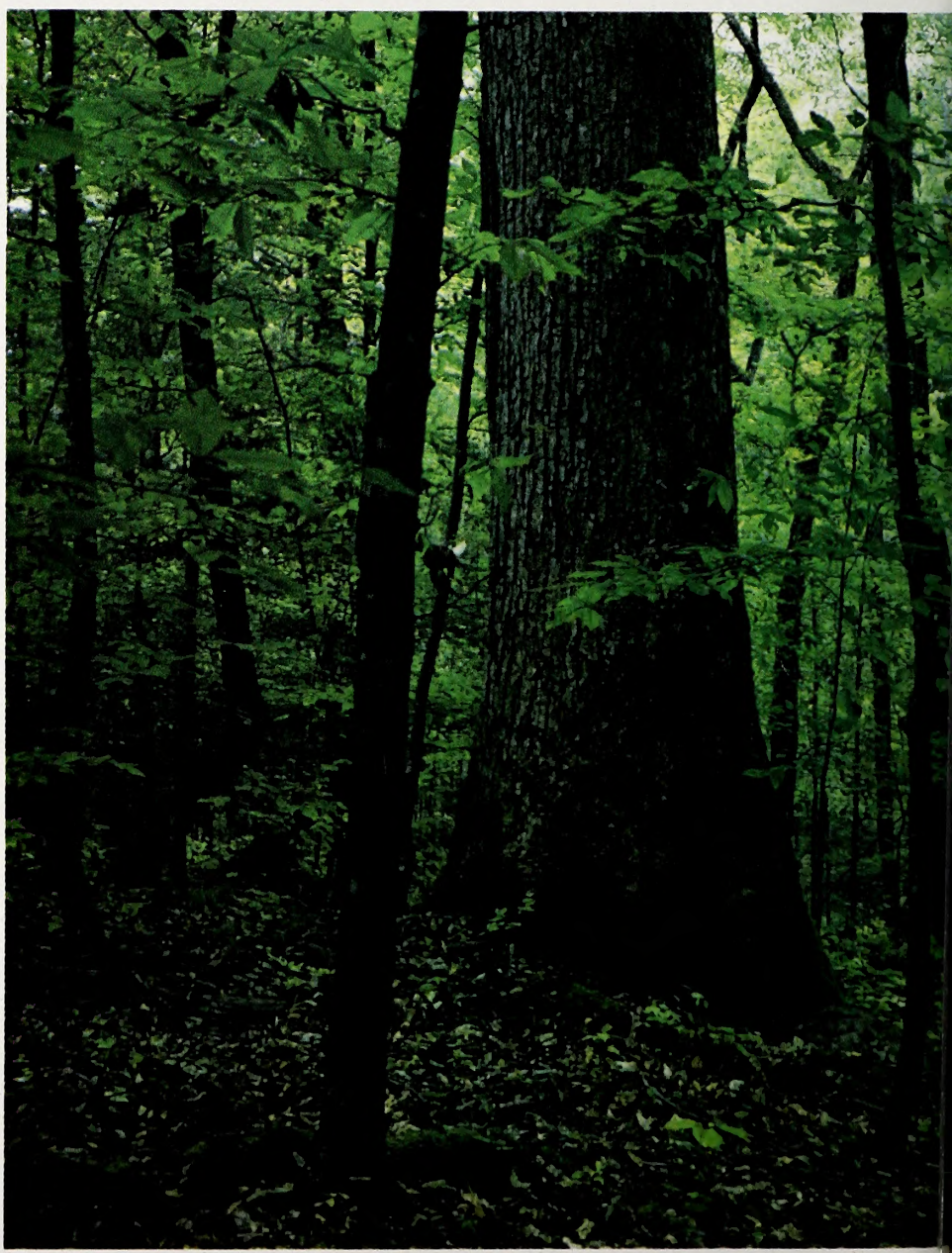
And where does the sportsman fit into this?

On Forest Service land, hunting and fishing is encouraged. Many of the Game Lands in western North Carolina are on Forest Service land, and are managed jointly by the N.C. Wildlife Resources Commission and the U.S. Forest Service. The hunter is an unwelcome guest on Park land, however.

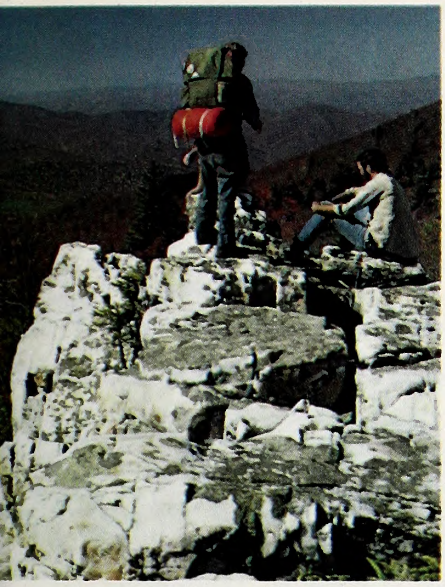
"We allow some fishing in the park, but hunting is not allowed to any degree," said Evison. "We feel that hunting isn't compatible with our



Ken Taylor



N.C. Travel and Tourism/Clay Nolen



N.C. Travel and Tourism/ Clay Nolen

The Kingsnake is found throughout the mountains, and is a constrictor. These snakes will kill small rodents, other snakes, and smaller members of their own species.

These three hikers are enjoying an outing in the Shining Rock Wilderness. Heavy hiker use has caused severe erosion problems on some of the more popular trails in the mountains, and has also led to stream pollution around campsites. Both the Forest Service and the Park Service are trying to distribute the hiker use of the mountains more widely, so that the main trails will take less of a beating.

The Joyce Kilmer National Forest contains some of the largest hardwoods in the east. Due to the steep terrain, loggers never cut this forest, making it one of the few remaining stands of virgin timber in the east.

philosophy of managing the park, and that it would conflict with other uses and upset many of the visitors. The only way I could ever see hunting, and these are my personal feelings and not Park Service policy, is if a guy came in and hunted with spears or a bow as primitive man did. If we let hunters in now, we'd lose a lot of our wildlife; they might shoot a few of the mountain lions roaming the hills, plus they'd be a hazard to other park visitors, too."

Late one night, coming back to Raleigh after talking with the Park Service and Forest Service people, I started thinking about the differences in their programs.

Like most difficult questions, there probably isn't a right or wrong approach. Both agencies are doing their utmost to let people use the land, without abusing it. The Forest Service is more popular with local people because they can cut firewood on the forest, some make a living logging it, and they can hunt on it. The Park Service has riled many local people with their preservationist philosophy, yet the Smoky Mountains is the most heavily used park in the nation, and caters to a different crowd than the National Forest does. Without a doubt, many of the people visiting the park would object if hunting were allowed within its boundaries. Yet one wonders why a hunter couldn't be allowed in some parts of the park for a little while each year.

As the road decends into Asheville, I see row on row of motels with glittering signs lighting the sky. As time goes by, the Appalachians will continue to become the playground for ever-growing crowds of urbanites seeking relief from the crowded cities and suburbs of the eastern seaboard. They will demand more recreation, more hunting, more camping, more spots to fish, and just places to get off alone. Conflicts are inevitable, yet maybe in their own way, both the Park Service and the Forest Service will be able to meet the different needs of everyone from sportsmen to bird watchers and backpackers.

Mark Taylor is Assistant Editor of Wildlife in North Carolina, and interviewed personnel from the Park Service and Forest Service in the mountains to get this story.

Regulations; Having Your Say!

For the past few years, anglers throughout the State have been concerned that our bass lakes are being overfished. What to do about it? Many sent their suggestions to the N.C. Wildlife Resources Commission's Inland Fisheries Division. The most common suggestion which was to stock bass in heavily fished waters was discarded because it is economically unfeasible. One man suggested that lakes under heavy fishing pressure be made trophy bass lakes by raising the minimum length limit on largemouth bass. After conducting an extensive survey on nine lakes, the Inland Fisheries Division found many anglers favored the move on an experimental basis. As of January 1, an 18-inch minimum length limit on largemouth bass became "law" on four North Carolina lakes, Cane Creek Lake in Union County, Lake Higgins in Guilford County, Lake Thom-A-Lex in Davidson County and Lake Tillery in Montgomery County.

Sportsmen do have a say on how their wildlife resources are managed, and the four new trophy lakes are a good example of how sportsmen and the Wildlife Resources Commission can work together. To try and change a regulation or get a new one, it helps to understand how the Commission and the Legislature work.

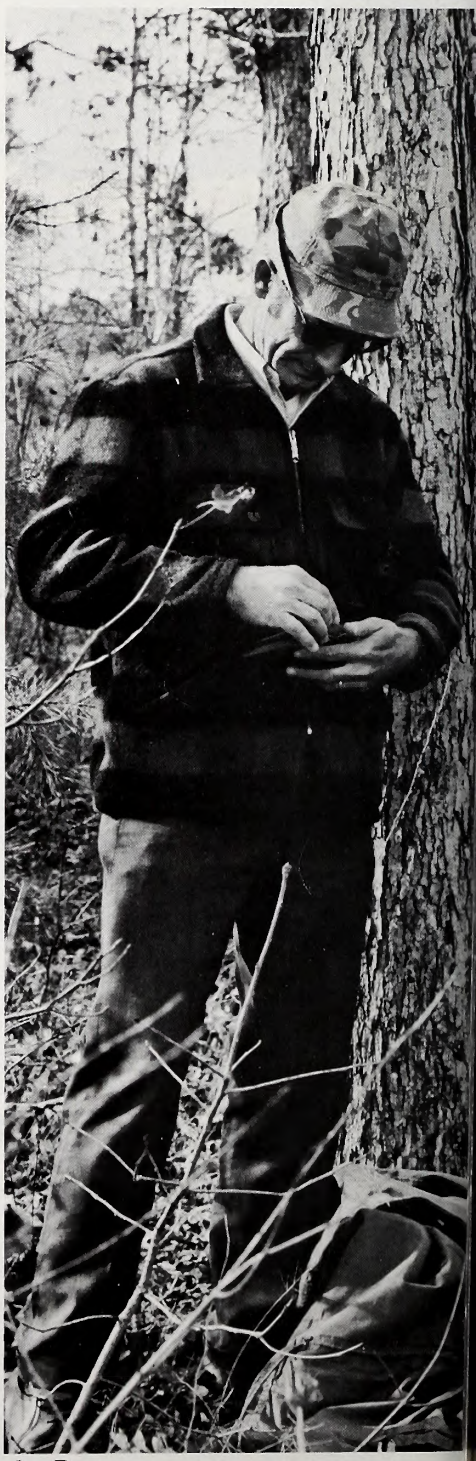
The Commission is often asked to make changes which it does not have the power to do. It should be pointed out that, in addition to regulations which may be made by the Wildlife Commission, many State statutes or laws affect the management of North Carolina's fish and game. Laws, of course, are passed by the Legislature and cannot be changed by the Commission. Because of the vast number of wildlife laws currently on the books, many issues are often confused and the Wildlife Commission is sometimes unable to manage fish and game as they feel these valuable resources should be managed. In fact, this problem has become so acute that a complete study and possible revision of all laws affecting the State's wildlife resources is presently underway. All interested sportsmen should keep abreast of happenings associated with this study.

Presently, hunting and fishing regulations take the following route:

First of all, if you want to suggest a change or a new regulation, start with a personal letter. Address it to the appropriate division listed on the contents page of this magazine. Make it clear, to the point, and easy to read. Outline your idea and stick to the subject. Remember Sergeant Joe Friday's admonition to talkative witnesses, "Ma'am, all we're looking for is the facts."

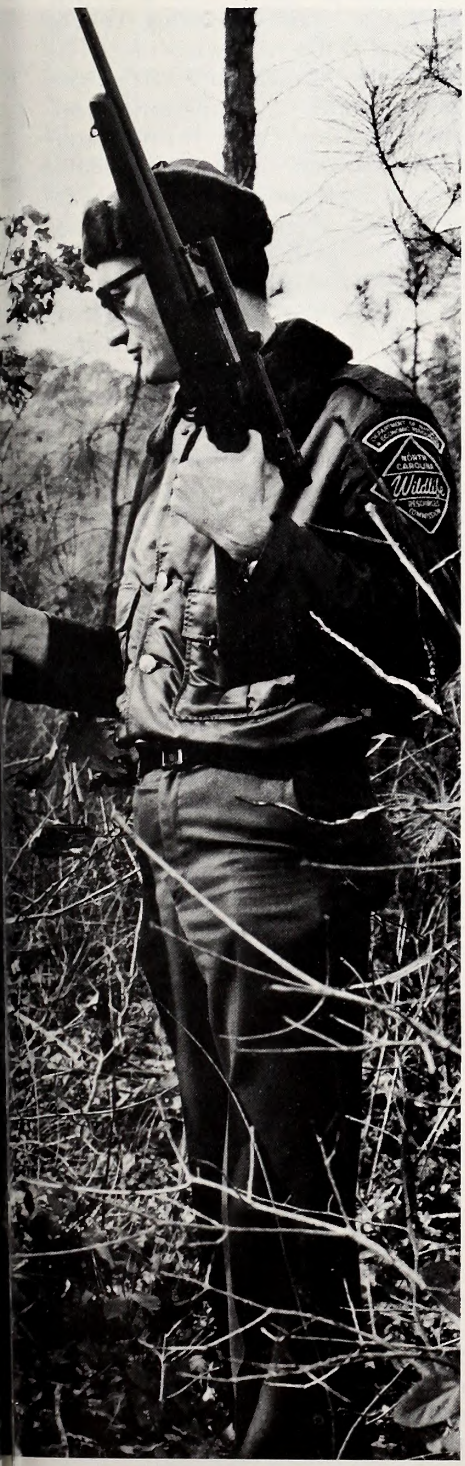
Now, I can hear some cynics out there mutter "Everyone knows a sportsman's letter only ends up in the circular file." Not so, every letter received by the Wildlife Resources Commission is placed in a permanent file which is read by the appropriate people within the agency.

The first step in the lawmaking process for fishing regulations occurs in the early summer when the Inland Fisheries Division meets with enforcement officers, biologists and other concerned employees. The group hashes over the letters it has received, and makes suggestions for new regulations. Some of these ideas are weeded out due to biological or enforcement problems. For example, if lowering the length limit on a species of fish would mean many would be taken before reaching sexual maturity, the idea is biologically unsound for it would diminish the resource. If a proposal is



Jim Dean

Sportsmen do have a say in how regulations are made. To have the biggest influence, you have to understand how the system works. by Mark Taylor



also impossible to enforce, or if it would benefit only a minority at the expense of the resource or the majority of the sportsmen, it is also discarded.

The proposals which make it past this point are consolidated by the appropriate division, and then presented to the 13-man governing body of the Wildlife Resources Commission known as the Wildlife Commission. If the commissioners can't see a sound reason why these ideas shouldn't become regulations, they're referred to public hearings.

Public hearings are usually held in late September for fishing regulations and offer sportsmen a chance to lobby for those regulations they want, and to speak against those they dislike. Once again, for maximum effectiveness, speakers should know what they want to say beforehand and keep their speeches short and to the point.

After the final public hearings, the proposals are again reviewed by the Wildlife Commission and are either rejected or adopted. A digest of those is then organized and printed for distribution to license agents, news media and the license-buying public before the new fishing regulations become effective on January 1.

"The trophy bass regulation on those four lakes is a good example of how sportsmen and the Wildlife Resources Commission can work together," Don Baker, chief of the Division of Inland Fisheries commented. "We know excessive fishing pressure is a potential problem. By increasing the minimum length limit on these four lakes as an experiment, we'll be able to see if it's a management tool that can be used elsewhere as needed. What we try to do above all else when we draw up a regulation, is try to protect the resource and still be as lenient on sportsmen as we can within the bounds of good management. When those lakes recover, the limitation can be taken off. If it works, it will only be used as a tool when we need it."

The procedure for making up a game regulation is basically the same, but runs on a different timetable. Hunting and trapping regulations run from August 1 to July 31 while fishing regulations run from January 1 to December 31.

"We hold our first meeting on hunting and trapping regulations early in January, and go through suggestions we've received from sportsmen then," said Hal Atkinson, chief of the Commission's Division of Game. "After that, we weed out ideas and form new regulations, using a series of meetings within the division similar to those that the Inland Fisheries uses. We hold public hearings early in April. The Commission makes the final decision at its monthly meeting in May, and the regulation digests are sent to the license agents and media by mid-July. New hunting and trapping regulations become effective August 1."

While most suggestions received by the Commission from sportsmen do not become regulations, all are carefully considered. Anyone having a suggestion for a new regulation or a change in a regulation should write to either the Division of Game or the Division of Inland Fisheries at the N.C. Wildlife Resources Commission, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611. Even if your suggestion isn't adopted, it gives us a valuable insight into what is bugging you. Besides, we enjoy hearing from you. ◆

Mark Taylor is Assistant Editor of "Wildlife in North Carolina"

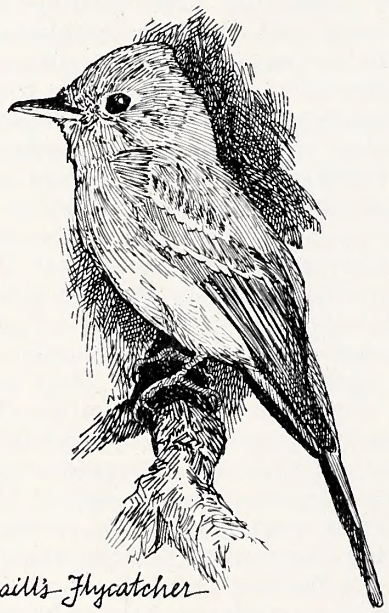
Back of the Book

Ornithological Meeting Slated

A joint meeting between the Carolina Bird Club, Tennessee Ornithological Society, and the Georgia Ornithological Society will be held from April 28-30 at Fontana Village at Fontana Dam, N. C. 28733.

The meeting will feature a bird art exhibit, movies, discussions, lectures, and field trips. Special lodging rates are available for birders, if reservations are made before April 12 with Fontana Village at 704-498-2211.

For more information contact Franklin McCamey, 4676 Andover Court, Atlanta, Georgia 30360.



Traill's Flycatcher

Ohio Trappers Are Victorious; Mass. Gunners Ready For Battle

Sportsmen in Ohio scored a victory recently, by their defeat of a proposed ban on the leg-hold trap, according to the National Wildlife Federation. On November 8, Ohio rejected a ban on leg-hold traps by a margin of almost two-to-one in one of the most bitter referendum votes ever held in the state. Of the 3,171,508 votes cast, 2,009,927 voted not to ban the leg-hold trap. And in Massachusetts, sportsmen are underfire, as a new anti-handgun scheme is afoot.

The Ohio Committee for Humane Trapping handled the anti-trap campaign in the state, with help from the New York based Fund for Animals and other animal protection groups, including the Canadian International Fund for Animal Welfare.

Ohio was looked to by animal protection groups as a bellwether for other states, and Michigan and Missouri are the next proposed targets of the anti-trapping movement, according to some sources.

Those opposing the proposal formed a group called Ohioans for Wildlife Conservation, and they insisted that the broadly worded amendment would rule out trapping mice, rats, and other pests with leg-hold devices. They also charged that modern trapping, when done right, is selective, while the "humane" traps kill indiscriminately.

Ohio produces about $10 million worth of raw furs annually, which is the second highest take in the nation. Major species include muskrat, raccoon, fox, mink, skunks, weasel and opossum.

In Massachusetts, anti-gun forces are gearing up to try and ban handguns again according to the National Rifle Association. The move is being headed by Bay State Public Health Commissioner Jonathan Fielding, who terms handguns a "health hazard" and wishes to have them confiscated. The Massachusetts Department of Public Health is actively promoting the program. The move's second step is to eliminate the "irresponsible storage of firearms in the home." Sportsmen fear that under this program, rifles and shotguns will have to be kept in clubhouses or at police stations where they will become prime targets for criminal theft, and that confiscation of their firearms will follow.

According to the Department of Public Health, firearms were the 13th leading cause of death in Massachusetts in 1976. Dr. Fielding claimed that "because of the serious consequences of the growing number of human injuries that involve firearms, gun control has become a concern for public health."

The Gun Owners Action League in Massachusetts (GOAL) is opposing the movement. This group was very active in opposing the first campaign to ban handguns, and the proposal was soundly defeated.

—Mark Taylor

December Enforcement Report

During the month of December, 1977 Wildlife Enforcement Officers for the North Carolina Wildlife Resources Commission checked 23,193 hunters and fishermen and 423 boaters.

Of the hunters and fishermen, 1578 prosecutions were made and 1,318 convictions obtained. Total fines collected were $21,929.83 and total costs collected were $30,830.42.

Of the boaters, 192 prosecutions were made and 158 convictions were obtained. Total fines collected were $652 and total costs collected were $3,809.

All fines and any arrest or witness fees are paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

Education kits with materials for use in the observance of National Wildlife Week March 19-25, are available free of charge from George Batts, 130 South Fuquay Ave., Fuquay-Varina, N.C. 27526. The featured bird (see back cover) is the peregrine falcon. Send for your material today.

Has Reached South Carolina!

Southern Rabies Epidemic Spreading Northward

A rabies outbreak which started in the early 1960's in northern Florida has reached South Carolina now, and health officials estimate that it will spread into North Carolina within the near future.

"The current epidemic of rabies among raccoons started between 1960 and 1963 on the Florida-Georgia border and has been working its way north ever since," Dr. John Freeman, Veterinarian for the N.C. Division of Health commented. "The states of Florida and Georgia have been completely covered, and its now up to about Charleston in South Carolina. There are no geographical barriers to stop it, so we figure it will reach North Carolina within two to six years."

The epidemic is being carried almost solely by raccoons, which have been very plentiful in certain parts of the southeast for the last 20 years.

"The reason the epidemic is confined mainly to raccoons is that most other animals don't have much contact with them," said Dr. Freeman. "Yet they are a social animal, so within their own species the disease spreads quite readily. We've had some cases of dogs and cats contracting the disease, which makes sense because these animals often will chase a raccoon, while a wild animal of another species won't have much to do with them."

Statistics back up the assertion that most of the rabies cases are confined to raccoons. In Georgia in 1976, there were a total of 225 confirmed rabies cases. Of these, 201 were in raccoons, nine in foxes, six in bats, four in skunks, three in dogs, one was in a domestic cat and one was in a bobcat.

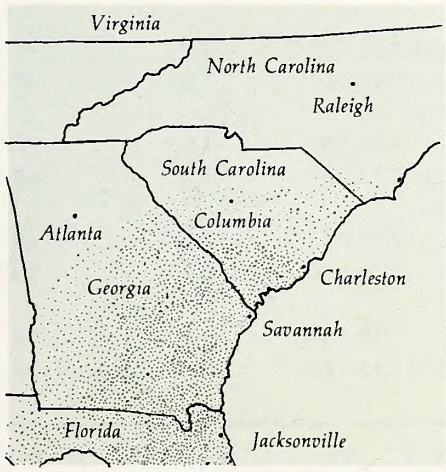
In 1975, there were 170 confirmed cases in Georgia. Of these 143 were in raccoons, three in skunks, two in cats, and one was in a horse.

In 1974, Georgia had a total of 133 cases, with 116 of these in raccoons, 10 in bats, four in cats, four in skunks, and three in foxes.

South Carolina has also shown a dramatic increase in rabies cases, most of them in raccoons. In 1974, there was a total of six confirmed rabies cases in the State, all of them in bats. As of the end of 1977, 11 rabid raccoons have been found in the State and three people are being held for observation at Hilton Head Island following contacts with rabid raccoons.

"No one knows if rabies is a control for high populations, or whether high populations lead to rabies outbreaks," Dr. Freeman commented. "But when animal populations are high, it spreads quickly, and when they're low, the disease often dies of its own accord. The higher the population, the more contacts a rabid animal can make."

Rabies is a disease of the central nervous system, and there are certain signs that people can watch for.



The current rabies epidemic in the southeast started somewhere near the Florida-Georgia border in the early 1960's, and has been working its way north.

"The best tip-off is when an animal isn't acting like itself," Dr. Freeman commented. "Rabies attacks the nervous system, so in effect, the animal becomes deranged. Often this shows up in bizarre behavior; for example, a fox will come striding into a crowded front yard at three in the afternoon. That certainly isn't typical fox behavior. The animals will also foam at the mouth, and as the disease progresses, they have coordination problems and difficulty walking."

Although animals having rabies often show visible signs of the disease, an animal can be rabid and appear normal.

"There's a certain time frame in which an animal has rabies and is spreading the virus without showing visible symptoms of the disease," Dr. Freeman said. "In dogs and cats it's a matter of several days. No one quite knows how long it takes in wild animals. This is one good reason why no one should ever handle wild animals or keep them as pets. If you get bit by a wild animal, especially a raccoon, try to capture or kill that particular animal so it can be tested for the disease.

Rabies is not only a threat to people and domestic pets, but can be a threat to livestock as well. When a rabid animal harasses a herd of stock, often the entire herd will have to be vaccinated. For people, the vaccination process includes a series of 24 shots, 21 of them daily on a consecutive basis. Although the treatment is painful, it is necessary; only one person has ever survived a case of rabies, and all wild animals that contract the disease die eventually.

"The best thing that folks can do is get their pets vaccinated and try to minimize the contact with animals that might be rabid," Dr. Freeman said. "This is a good reason not to keep wild pets. Even if the pets are purchased from a pet store, they may still have rabies because no rabies vaccine has been produced for wild animals. Wild animals should also not be brought in from out-of-state, whether they're certified disease-free or not. We have had two raccoons imported from Florida that were found to be rabid. These animals were supposedly "clean" and had been brought in by raccoon hunters, which is a fairly common practice in western North Carolina.

Cases of rabies have also been recorded where individuals contracted the disease by coming in contact with the blood, salvia, body tissue or feces of an infected animal.

"The epidemic will probably get here anyway, but by taking the proper precautions, we can minimize some of the risks," Dr. Freeman concluded.

—Mark Taylor

Is it harder to get permission hunt private land for big game small game? Is squirrel hunti better this year than last year? A there more hunters in the field nc than in years past, and what a they after?

All of these questions, and sor others, have been answered

Table I

A Comparison of Hunter Participation and Success Rate for Major Game Species in North Carolina In 1974-75 and 1976-77

Species	*Hunters*	*Trips Made*	*Harvest*	*Kill/Trip*	*Trip/Hunter*
Squirrel					
74-75	191,010	1,131,111	1,558,290	1.4	5.9
76-77	175,061	988,322	1,447,521	1.5	5.6
Deer					
74-75	161,860	1,302,260	53,079	.04	8.0
76-77	149,891	1,219,700	47,781	.03	8.1
Rabbit					
74-75	161,427	949,244	994,221	1.1	5.9
76-77	134,355	781,806	790,884	1.0	5.8
Dove					
74-75	131,888	627,691	2,276,993	3.6	4.8
76-77	118,546	539,199	2,280,800	4.2	4.5
Quail					
74-75	103,833	779,413	1,452,058	1.9	7.5
76-77	83,050	603,557	947,521	1.6	7.3
Ducks					
74-75	34,278	264,542	420,687	1.6	7.7
76-77	24,400	154,500	231,027	1.5	6.3
Raccoon					
74-75	33,964	332,277	208,611	0.6	9.8
76-77	24,494	292,881	176,530	0.6	12
Grouse					
74-75	16,340	68,492	38,154	0.6	4.2
76-77	12,786	63,925	32,196	0.5	5.0

Tab

What Factor Most Severely Lim

Answer
Not Enough Time
Not Enough Game
No Place To Hunt
Too Expensive
Other

Tab

Did You Have Proble With Which

District	*Yes*
1	2
2	6
3	3
4	4
5	6
6	6
7	3
8	4
9	1
Statewide	35

Record Roanoke Bass Caught

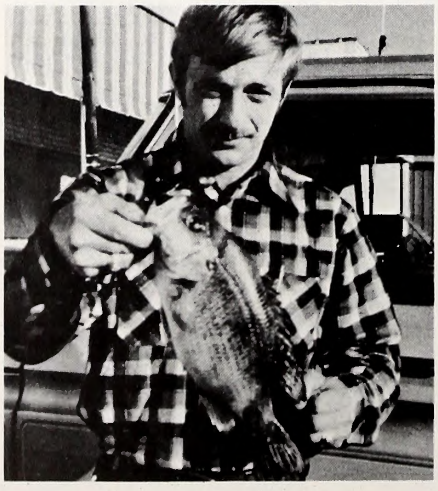
Dick Parker of Rocky Mount got an unexpected bonus last December 3 when he was fishing for crappie on the Tar River — he caught the new world's record Roanoke Bass.

The fish weighed in at two pounds, four and-one-half ounces and was 13⅞ inches long.

"I was fishing at the tail race of a dam on the Tar River when I caught the fish," Parker said, "hoping I'd get some crappie. The guy I was with fishes for Roanoke Bass all the time, and he was more thrilled than I was when I caught it."

The fish was caught on a spinning outfit with 10 lb. test line and an Evans Leadbelly Jig.

The Roanoke Bass very closely resembles the Rock Bass, and its range in North Carolina is limited to the Tar River system and the upper Neuse River system. The previous record was taken by Jim Denton on October 23, 1977, at Fishing Creek in Halifax County and weighed in at one pound-12 ounces.



Wild Foods Weekend Scheduled

The North Carolina Wild Foods Weekend will be held March 31 to April 2 at the Betsy-Jeff Penn 4-H Center near Reidsville. The program will start at 7:30 pm on Friday evening and will include instruction in identifying, gathering, preparing, and eating a wide variety of edible plants and other wild foods under the guidance of specialists in the field.

Cost includes a $5 registration fee and moderate rates for meals and lodging at the 4-H Center. For more information write to Wild Foods, Rockingham Community College, Wentworth, NC 27375.

...ives Hunters The Answers

...rth Carolina's 1976-77 Hunting ...port. The findings are the result ...the compilation of questionnaires ...nt to 5,410 sportsmen throughout ...e state. Rather than go into a ...gthy explanation of the findings ...the study, we'll present you with ...e data and let you draw your own ...nclusions.

...Amount of Hunting You Do?

...lumber Responding	Percent
1,441	50.5
539	18.9
457	16.0
149	5.2
267	9.4

...ating A Cooperator Agent ...ister A Big Game Kill?

...No	Percent Yes
42	4.5
03	5.5
73	3.9
60	6.3
44	12
59	9.2
41	6.8
58	6.5
39	2.5
19	6.3

Table IV

Did You Have A Difficult Time Obtaining Permission To Hunt Big Game On Private Property?

District	Yes	No	Percent Yes
1	28	47	37.3
2	87	113	43.5
3	65	92	41.4
4	67	71	48.6
5	51	93	35.4
6	72	97	42.6
7	59	69	46.1
8	54	61	47.0
9	28	63	30.8
Statewide	511	706	42.0

Table V

Did You Have A Difficult Time Obtaining Permission To Hunt Small Game On Private Property?

District	Yes	No	Percent Yes
1	24	70	25.5
2	67	186	26.5
3	56	200	21.9
4	67	156	30.0
5	69	200	25.7
6	100	200	33.3
7	53	135	28.2
8	72	158	31.3
9	30	115	20.7
Statewide	538	1,420	27.5

Water Quality Standards May Be Upgraded

The State's Environmental Management Commission is studying the upgrading of water quality standards to reduce the amount of pollutants discharged into public waters. The new standards would incorporate recent technological advances in identification and control of pollutants. Dischargers would be required to take extra precautions to reduce release of toxic elements and in some cases would be required to install standby power for treatment facilities and backup disinfection equipment.

The standards are designed to ensure that the carrying capacity of receiving waters will not be exceeded, and that aquatic life and downstream users will not be endangered. Persons wishing to express support or opposition to the new standards should contact Mr. David Park, P.O. Box 27687, Raleigh, N.C. 27611.

—Frank Barick

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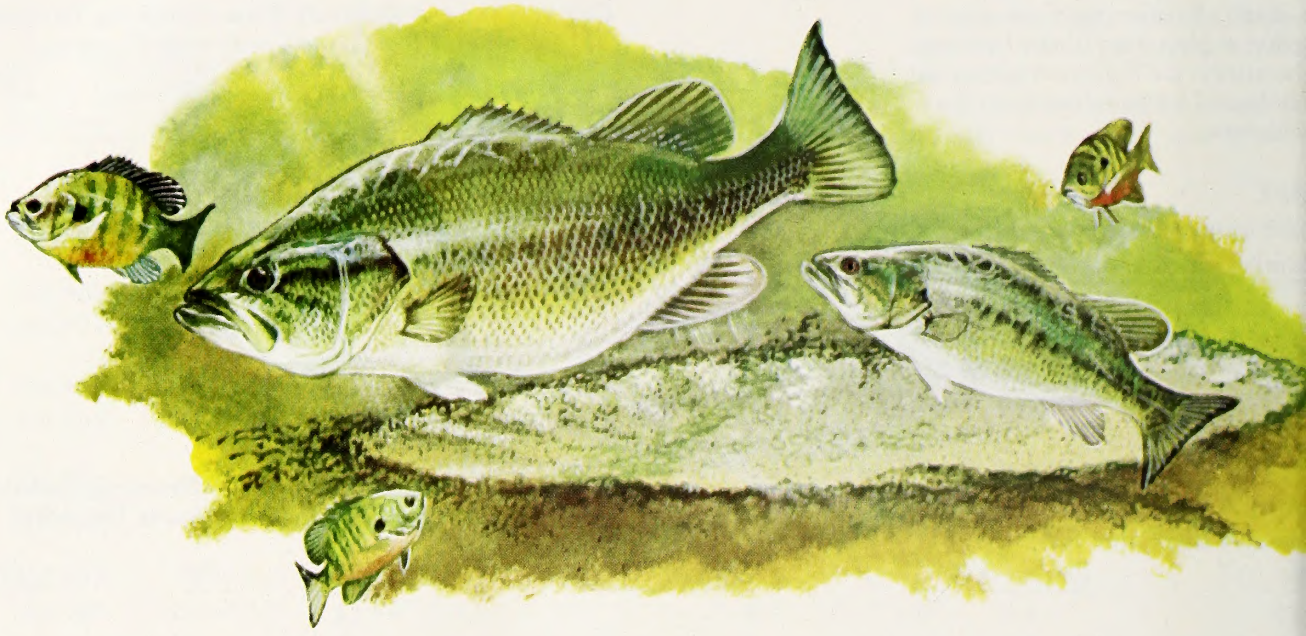
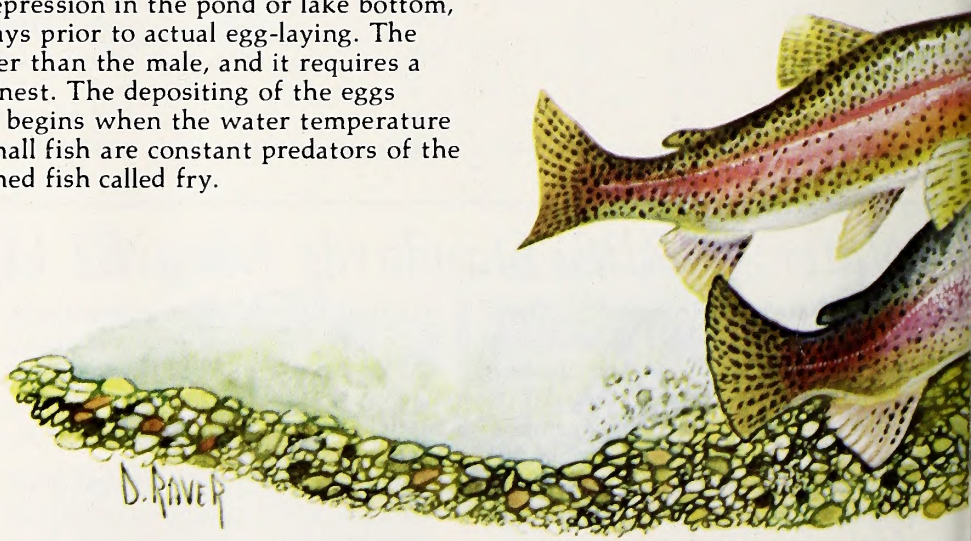
Spawning Time

By Duane Raver



The spawning season of most fish is dictated by the temperature of the water. Nest building of the largemouth bass begins when this temperature reaches about 60°F. The nest is usually about three feet in diameter and is a saucer-shaped depression in the pond or lake bottom, scooped out by the male several days prior to actual egg-laying. The female is usually considerably larger than the male, and it requires a bit of coaxing to bring her on the nest. The depositing of the eggs requires several hours and usually begins when the water temperature reaches 64°. Bluegills and other small fish are constant predators of the bass eggs and the tiny newly hatched fish called fry.



THE DEVELOPMENT OF STRIPED BASS EGGS AND FRY

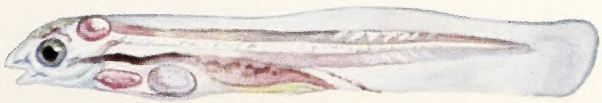
EGG 30 HOURS AFTER FERTILIZATIO

FERTILIZED EGGS

Bluegill nests or beds are often constructed in groups of four or five up to as many as several dozen. The big humpbacked male bluegills are often a dark purple or bronze while the females are brighter in yellows and greens. Unlike bass, bluegills are considered easy to catch from the bedding areas. Harvest at this time helps prevent later overpopulation of the fine panfish. A popping bug or a sinking wet fly makes a good lure for bluegills.

Rainbow trout scoop out spawning beds called redds but these are little more than loosened gravel depressions fashioned in shallow, clean running water. The trout pair moves slightly upstream from these locations where the female releases hundreds of orange-colored eggs which are fertilized by the hook-jawed male rainbow. The eggs drift back and settle among the loosened gravel. Several redds may be used by the same pair, progressing upstream as the dislodged gravel covers each downstream nest. Spawning takes place in very early spring with hatching following weeks later.

FRY 24 HOURS AFTER HATCHING



FRY 10 DAYS OLD

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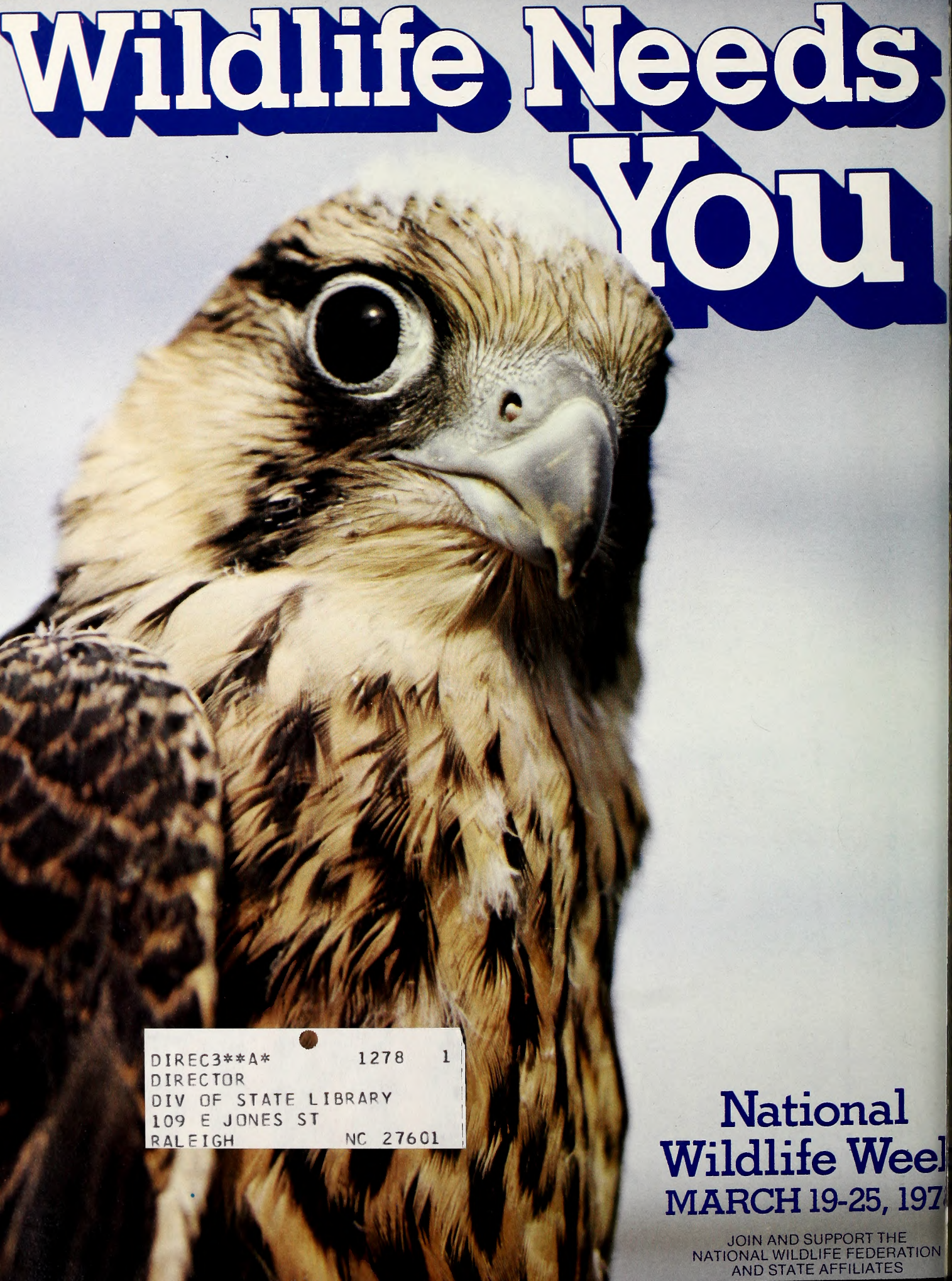

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WILDLIFE IN NORTH CAROLINA

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Sport Hunters: The Unsung Friends Of Wildlife

"The sport hunter pioneered modern game management and literally saved countless species from likely extinction."

No one knows exactly when men first began to hunt game strictly as a business in North Carolina, but market hunting goes back a long way. Some market hunters sought certain species of wildlife strictly for their plumage, furs or hides. For example, the Carolina parakeet is extinct largely because its colorful feathers were highly desirable in women's apparel many years ago.

Canvasback Ducks Were Favorites Of Market Hunters.

Other market hunters concentrated on meat. They sought deer or waterfowl and sold their kill the way a farmer sold his crop. It was business, and no one felt guilty about it. Why should they? Back then, hunting for business was an honorable way to make a living. Nature was bountiful. Game was a God-given crop.

Actually, they were quite right in the sense that wildlife can be a harvestable crop. But market hunters made two errors. Market hunting was virtually unregulated, and no thought was given to perpetuating the various popular species. From a business standpoint, it was dumb. From an ecological standpoint, it was even worse.

Consider waterfowl for example. The hunting of ducks and geese became an incredibly large business. Probably the first written record in the Currituck Sound area (one of the favorite sites) shows that a man named Edgar Borroughs who lived on Back Bay just north of the North Carolina, Virginia line employed 20 hunters to shoot waterfowl in the winter of 1856. His crew used 23 kegs of black powder from fall until the end of December. Unquestionably, the waterfowl which fell before Borrough's crew must have been a staggering total.

Market hunting for waterfowl became such a big business in eastern North Carolina that large sidewheel steamers were used to ship ducks and geese to northern markets. One record shows that two men — Russel and Vanburen Griggs — once killed 892 ruddy ducks in one day.

Market hunting was hardly a way to get rich, although canvasback ducks — perhaps the most popular species — varied in price from .50 to $1.25 apiece. At one point, nearly 100 batteries (blinds and decoy sets) operated in Currituck Sound.

Finally, a growing awareness that uncontrolled market hunting had caused the extinction of some wildlife species and threatened many others brought laws and regulations which ended the era of legal market gunning.

Ironically, it was another kind of hunter which led the renaissance of regulated hunting– the sport hunter. Sport hunters successfully pushed Federal and State governments into outlawing most kinds of market hunting, and in turn set up the regulations whereby any harvest in the name of sport would be strictly controlled. Furthermore, license funds were earmarked for restoration and enhancement of wildlife populations.

During the roughly half century since market hunting ended in North Carolina, no species of wildlife hunted for sport has been made extinct or even threatened by sport hunting. Indeed, under careful management, many species have made a remarkable comeback.

Even trapping, a holdover from the old commercial days, is carefully regulated, and the harvest has no adverse effect.

It is unfortunate — and unfair — that sport hunting is held in disrepute by many today, especially since the sport hunter pioneered modern game management and literally saved countless species from likely extinction.

Hunting still reaps a profit in North Carolina, but now it's plowed back into the resource and that makes all the difference.

by Jim Dean

WILDLIFE IN NORTH CAROLINA

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Illustrated By David Williams

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Worthington Whitredge (1820-1910)

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ercatcher with brood pouch extended to cover her eggs from the sun.

uses her long bill to turn her eggs to maintain an even temperature.

minutes old, the tiny oystercatcher leaves the nest.

South of Wrightsville Beach, directly across from Masonboro Inlet, is a 9½ mile barrier island of shifting sand dunes, swaying sea oats and unspoiled charm. This strand, known as Masonboro Inlet, has become a popular locale for afternoon boaters, weekend campers and surf fishermen. Each year the island's popularity increases tremendously.

On Masonboro Island — as on many other barrier islands — the many human visitors are causing problems for a different type of visitor; the nesting shorebirds that frequent our coastal waters. Tremendous numbers of shorebirds have used this island and others, in the past, to establish their nesting colonies and rear their young.

Shorebirds At The Crossroads

Man Is The Biggest Threat To Nesting Shorebirds

written and photographed by Duncan Dawkins

Today, partly because of the pressures of civilization, the numbers and species of shorebirds which nest on these islands have diminished.

What happens on Masonboro Island each spring and summer is fairly typical. Instinct drives shorebirds such as the least tern, willet, black skimmer and the American oystercatcher to return each spring to build nests and establish large nesting colonies. All of these shorebirds build their nests on the ground and use the natural camouflage of both the adults and the eggs to avoid predators. The food supply is abundant and shorebirds can be seen feeding on and around this island year-round. While feeding and resting these birds will tolerate relatively close approach by humans. However, when the nesting season arrives, the shorebirds change their habits and a critical period begins in which approach by humans can lead to the death of the shorebird's young.

The American oystercatcher, the first nester to arrive on Masonboro Island, commences the courtship rituals in early March. The birds pair off and begin nest construction by making a shallow depression in the sand and lining it with bits of broken shell. The nest is unusually hard for humans to see and is easily stepped on by people enjoying a walk on the island. The shallow depression usually contains three light gray colored eggs with black splotches — the eggs are almost perfectly camouflaged.

The oystercatchers do not congregate in colonies as such and are usually randomly scattered across the island. The probability of someone stepping on the eggs is low, but just the presence of people in the vicinity of the nests will keep the adult birds away. If the adult is kept off the nest during the heat of the day for any length of time, the sun will overheat and kill the developing chicks inside the eggs. The adult must stay on the nest to protect the eggs from the heat. This is how most of the damage to the oystercatcher population on Masonboro occurs.

The willet is usually the next shorebird on the island to

begin its nest construction. Like the oystercatcher, the willet does not nest in large colonies, but is scattered randomly about the island. The nest is built on the ground and is most commonly found hidden in a clump of vegetation. The willet lays an average of five eggs which are an olive green with dark brown splotches. Unlike the adult oystercatcher, which immediately leaves the nest in the presence of danger, the adult willet remains motionless on the nest until the last possible moment, then usually takes flight just before an approaching person reaches the nest. This leads the person directly to the nest containing the eggs. Children have been observed picking up the eggs and bringing them back to their parents.

People have even removed the eggs from a willet's nest and swapped them with the eggs of an oystercatcher which was nesting nearby as a practical joke. Some breakage also occurs when people accidentally step on the eggs as they cross the island to the beach. Still, most destruction is unintentional and could be avoided if visitors are aware of the presence of nests on the island.

The least tern is the next species to arrive on the island to begin nesting. This shorebird establishes large nesting colonies and can be found on the north end of Masonboro Island on the large sand flats. Because of this location, the least tern suffers more from human interference than any other shorebird found on Masonboro Island. The nesting site is in the direct path of campers, fishermen and beachcombers walking from the sound side of the island to the ocean side.

The least tern lays its eggs in nothing more than a shallow depression in the sand. Three small eggs are usually found in the nest and these are hard to distinguish from the surrounding sand even when someone is looking directly at them. Once the eggs hatch, the chicks either remain motionless in the sand or seek shelter under a nearby shell or clump of plants.

The chicks are as hard to see as the eggs, and because of the vast number of nests in the colony, it is almost impossible to walk through the area and not step on an occupied nest.

On weekends during the height of the season, as many as 50 people a day may walk through the colony. The adult terns, who are constantly frightened away from the nests of unhatched eggs, swoop and dive at the people who are walking through the colony. This aggressive action usually scares the person, and he begins running, not realizing there are eggs and chicks underfoot. The mortality rate of the least tern is extremely high.

Black skimmers nest in a colony just south of the least tern in a path used by many people to get to

the oceanfront. The black skimmers must constantly fly off their nests because of approaching humans. The nests are shallow depressions in the sand, therefore the adults, chicks and eggs suffer the same misfortunes as the least tern. One advantage is the eggs of the black skimmer are more easily seen so the mortality rate is lower.

Because of pressure from humans and natural calamities such as hail storms, abnormally high tides and predation, the shorebirds may eventually abandon Masonboro Island and other similar nesting grounds altogether.

The plight of the birds nesting on Masonboro Island is just one example of the problem facing nesting shorebirds on North Carolina's barrier and dredge islands. As these isolated islands become more and more popular, damage to the nesting populations may increase unless visitors take care not to disturb these birds and nests. The shorebirds found in our coastal waters are a valuable asset to the beauty and natural history of coastal North Carolina. Their future may well depend on whether or not we control our curiosity and leave them alone.

Duncan Dawkins spent many hours over a two-year span shooting photographs and studying the shorebirds on Masonboro Island. He is from Wrightsville Beach.

Motionless and wary, a willet (far left) broods her eggs in a nest she built at the base of a clump of one of the beach grasses. The dappled sunlight helps hide the bird even more. Ground-nesting birds must rely on natural coloration among vegetation for protection. It doesn't always work. This least tern chick (left) downed its meal (probably a fingerling menhaden) in about five seconds. A ready supply of such food is nearby, but the adults must hunt and catch it, often leaving the chicks unprotected for many minutes at a time. The natural camouflage of the nests and least tern chicks (below) is quite evident. But the fact that they are difficult to see on the beach, also means that they are subject to being accidentally stepped on and injured. (lead photo) Over 10,000 royal terns are estimated to nest on this small dredge island.

As I slithered into the pool, trying (without much success) to convince myself that I enjoyed the cold water of a September trout stream, lo and behold! the magic circle appeared 20 feet away under the far bank. Self-pity faded when still another rise told of an actively feeding trout. There was little evidence of insect life on the surface or above it, yet something had moved this fish to feed actively. A number 12 female Adams fly with yellow egg sack was attached to my leader. Why not? Three fairly decent casts later he rose again. Insulted by his impudence in ignoring the Adams, I laid it nearly on the far bank. That was it. Splash, jerk, run, jump, wallow and jump again. A plump 11-inch brown trout was landed, unhooked and released. Man Triumphant! Or maybe just a little lucky. I wonder why he hit that fly?

Dry fly fishing for trout is based for the most part on the cycle of the mayfly. These interesting little creatures make up a large and, to us, very important part of a trout's diet. There are many thousands of varieties of mayflies worldwide. Those of importance to fly fishermen are fortunately limited to a recognizable few dozen. The life cycle of a mayfly is a complex one, reminiscent of the spawning run of a Pacific salmon. The various species spend from one to three years as crawling creatures on the bottoms of trout streams (and of course other types of fresh water). Some prefer fast rocky runs while others take to slow sandy pools.

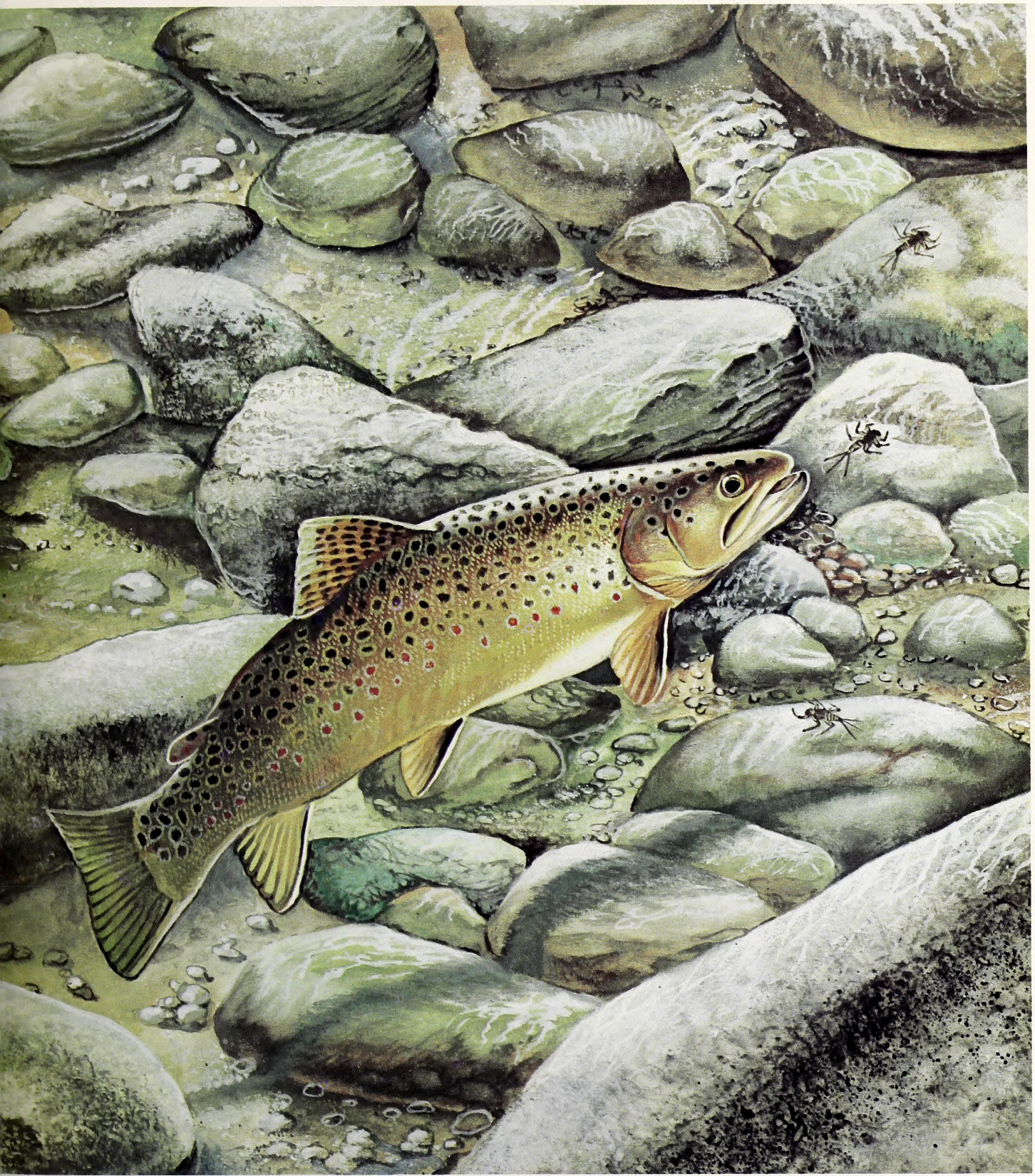
After completing their underwater cycle, their mating time arrives. Slowly and in various ways, they rise to the surface. Some kinds spread their wings and take off immediately. Others must drift along the surface for a distance as they spread their wings to dry. Trout have a ball with these hatching insects. Nevertheless most of them make it into the air. Hovering above the water, the air will at times be filled with thousands of mayflies over a single short stretch of stream.

The flies, called duns by trout fishermen and sub-imagos by biologists, now begin to spread out to the nearby bushes, trees and grass. The insects usually spend one night among the foliage. During this time they undergo a remarkable change. Their mouths are sealed off, they become thinner and more difficult to see, and reproduction is their only remaining function. Swarms of flies once more dance above the water as mating takes place. We call them spinners, while to the biologist they are imagos. The fertilized females dip down to the water and lay their eggs. A single fly may make a dozen dips to spread her progeny around. Finally, when the nuptial dance is over, the flies die, falling into the water in swarms. These are the spent-wing flies of trouter lingo. There are times when a trout will take only the dun, at other times the spinner, and for unknown reasons, some feed only on the spent-wings.

For hundreds, perhaps thousands of years, fishermen have used chicken feathers and other similar materials tied to hooks in order to fool trout and other fishes. But it apparently was left to a retired British banker named Frederick Halford to bring the art to a new high. Instead of laying the feathers alongside the hook, Halford attached the feather at a right angle,

Unselective

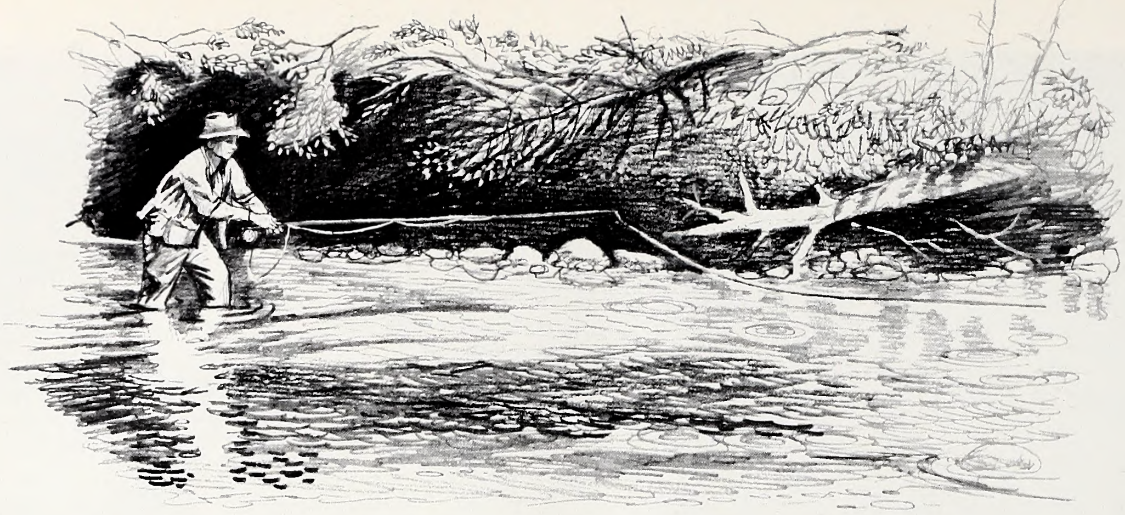
Matching The Hatch Is Rare



Trout

by R. Wharton Gaul
illustrated by Duane Raver

ne Key To Success In Our Streams.



and then wound it around the hook as though the feather were a knife slicing the hook. The result was a floating bristly bug-like thing which could be tied to resemble certain mayflies. Feathers from the necks of certain chickens were found to be most suitable, and an American by the name of Theodore Gordon brought the new idea to our continent. All of this took place nearly one hundred years ago. We've had a lot more fun since then!

North Carolina approaches the southernmost extent of abundant native trout fishing. When the white man first arrived, the brook trout, popularly called the "speckle," was the only native trout. But the brookie is a sensitive creature, requiring very cold, very pure water. Once civilization arrived, his days were numbered. Forests were ripped from the mountains and roads were cut, allowing siltation and warming.

Native brook trout are hard to find these days. Stockings of rainbows and brown trout have made it possible to maintain remarkably good fishing in the mountain streams. And in those more remote waters where reproduction can take place, and where mayfly hatches appear regularly, something approaching wilderness fly fishing can occur. But the heavy hatches of northern and western streams are fairly rare. Even so, the sequence of flies and the hours of the hatch are predictable. Ernie Schweibert has catalogued these hatches for us, for those who like to play the game of "match the hatch." In North Carolina such opportunities are not too common. A recent day of fishing was more typical.

I started to fish in a tree-shaded area within sound of traffic. It was midsummer. Midges were on the water and at rare intervals a small caddis fly or blue-gray mayfly would drift away from the surface of the creek. But the fish were there and on the prod. Two pretty speckles came from fast water. A single small brown was rising regularly in one pool to I knew not what. He hit my gray-hackle yellow as though it was Christmas dinner. Certainly nothing like my fly was hatching there.

Later I moved to a larger stream of water which I had never fished before. It was a typical mountain river. Just above and over a 20-foot riffle, a heavy hatch of fly appeared. But this was a large (number 10) red-purple fly I had seen before. In all my encounters with it, there had never been reason to think trout wanted it. And no trout were there. I tried several patterns without success. Later one gorgeous rainbow came to net in another area after striking a brown and white bivisible.

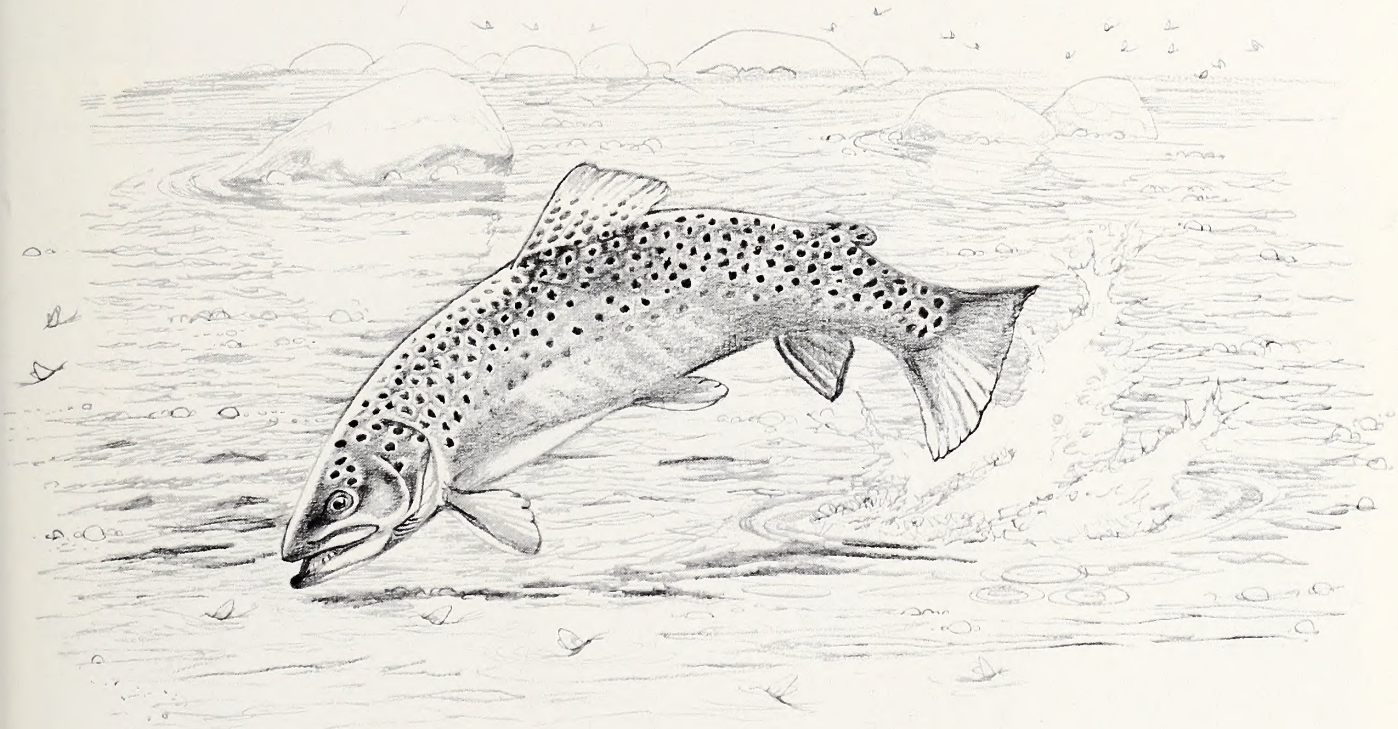
It would appear that trout will take what they think is food whenever they get the chance. This includes mayflies, caddis flies, terrestrials, crawfish, small fishes, in fact almost anything edible. It has been said that they have a cheerful boa constrictor attitude towards food. And one of the secrets of trout fishing is the awakening of that instinct.

Jim Gasque tells us of a remarkable gentleman of the Great Smokies area named Mark Cathy who knew that secret. Mark seldom fished any pattern other than a gray hackle yellow. His sorcery lay in his skill in making the fly move. His hands trembled as he vibrated the fly over the waters. Using a short heavy leader, he had control most of us lack the patience to learn. The twitching fly resembled a dun struggling to rise from the water. Trout found it irresistible. I have tried it once after seeing a trout take a fluttering fly within a few feet of me. It worked like a charm, yet I have seldom had the nerve to disturb the surface of the waters with such commotion since that time. Maybe next year.

Skill such as Mark Cathy possessed is rare. In an effort to find an easier way to provoke trout into striking, many so-called experts in the field have come up with any number of new flies, both in coloring and in design. There must be more than a thousand patterns recorded. If you happen upon a copy of Ray Bergman's book *Trout*, look at the plates of different fly patterns. It's enough to drive a trout to a psychiatrist.

And then there is design. Recent years have seen the appearance of the parachute-wing fly, the thorax fly, Wulff ties, terrestrials, and more underwater forms than I can recall. I am not aware that trout populations have been depleted as a result of this assault upon their senses. As a matter of fact, it remains more true than ever that, as Cathy himself said, it's a darned sight more important what's on the rod end of the cast than what's on the leader end. "Presentation" was the word several decades ago, and it is still the secret of taking a trout. You can't beat him over the head and still expect him to strike.

Personally, this writer is not too sure how important the pattern of a fly is. Several years ago a



Presentation of the fly (opposite page) may be considerably more important than the pattern or type of fly itself. Once you've "spooked" the trout, your chances of fooling him are slim. Seldom is the angler treated to a feeding display of leaping trout (left), and when it does happen, it doesn't always assure instant fishing success.

brown and white bivisible was my standard starter unless there was something else on the water. For unknown reasons, I have gravitated to gray and yellow patterns recently. The diary does not indicate any particular change in luck. For that matter more number 12's appear on my leader than before. Possibly a dimming of eyesight is more significant than what a trout prefers.

One experience may be worthy of note. Early last June, I encountered my first hatch of the March Brown (*Stenonema vicarium*). It seemed that some sort of weird caddis fly was upon the water. No, maybe it's an early grasshopper. Then closer inspection revealed it to be a mayfly. But what a fly! Nearly as big as the fabled Green Drake of Pennsylvania's limestone waters, or the Salmon fly of Three Forks country, this creature was driving the trout wild. They were rising within four feet of my legs. Native browns don't often do that. A cold winter had apparently delayed their normal hatching period by several weeks. Because my fishing is limited to the same periods year after year, I had never stumbled on this beautiful phenomenon before.

Pawing wildly through my fly box, there was no sign of a fly to match the March Brown. The biggest fly I had was a number 12 Orange Fishawk. But from the way those fish were feeding, it's probable that a number 2 cigar butt would have taken fish. One fish hit my fly, was pricked, tore loose, and hit it again on the second cast after the original one. He was duly landed and released. Man! It was wild! All in all, it reminded me of one of Bergman's ideas. Whenever he couldn't match a hatch for one reason or another, he would throw some large wild pattern at the trout to get their attention. Sometimes it worked. Sometimes.

In conclusion, I suppose one might say that trout like to eat. They seem to be the vacuum cleaners of the streams. Give them a reasonable chance to strike your fly without scaring them half to death and you may net a beauty. But if you don't need him, gently return him to the water. Trout are too expensive to catch only once.

R. Wharton Gaul is a Charlotte doctor whose spare time love is fly fishing for trout. He is a regular contributor to WILDLIFE IN NORTH CAROLINA.

Nature And Art: The Inseparable Companions

Virginia Partridge

The natural world — wildlife, the out-of-doors, hunting and fishing — has long been a favorite subject of artists. Early man used the juices of berries and roots to decorate his cave walls with scenes from his world including animals he knew, memorable hunting experiences, and other significant events of his day.

Few of these early art forms are available to us in this area. Yet we are most fortunate to have collections of exceptional art for public viewing in the several museums over the state. The outdoorsman will discover his world interpreted by some of the finest artists the world has ever known. The museum of art in your area needs and deserves your support. One visit will open doors to many vistas. The paintings reproduced on these pages are but a tiny sample of the works on display in only two of the State's museums of art: the North Carolina Museum of Art in Raleigh, and the Hickory Museum of Art, Inc., at Hickory, N.C.

In a sense, the collection of art owned by the State through the auspices of the North Carolina Museum of Art at Raleigh began with the acquisition of the Audubon Elephant Portfolio of "Birds of America." It was in 1846 that Governor William Alexander Graham decided that the State Library should have a copy of Audubon's work.

Wildlife is but one of the many themes that can be found in the collection acquired by the Museum over the years. Most of the paintings in the Kress Collection — the Foundation gift to the State which originally made the North Carolina Collection something special — have religious themes.

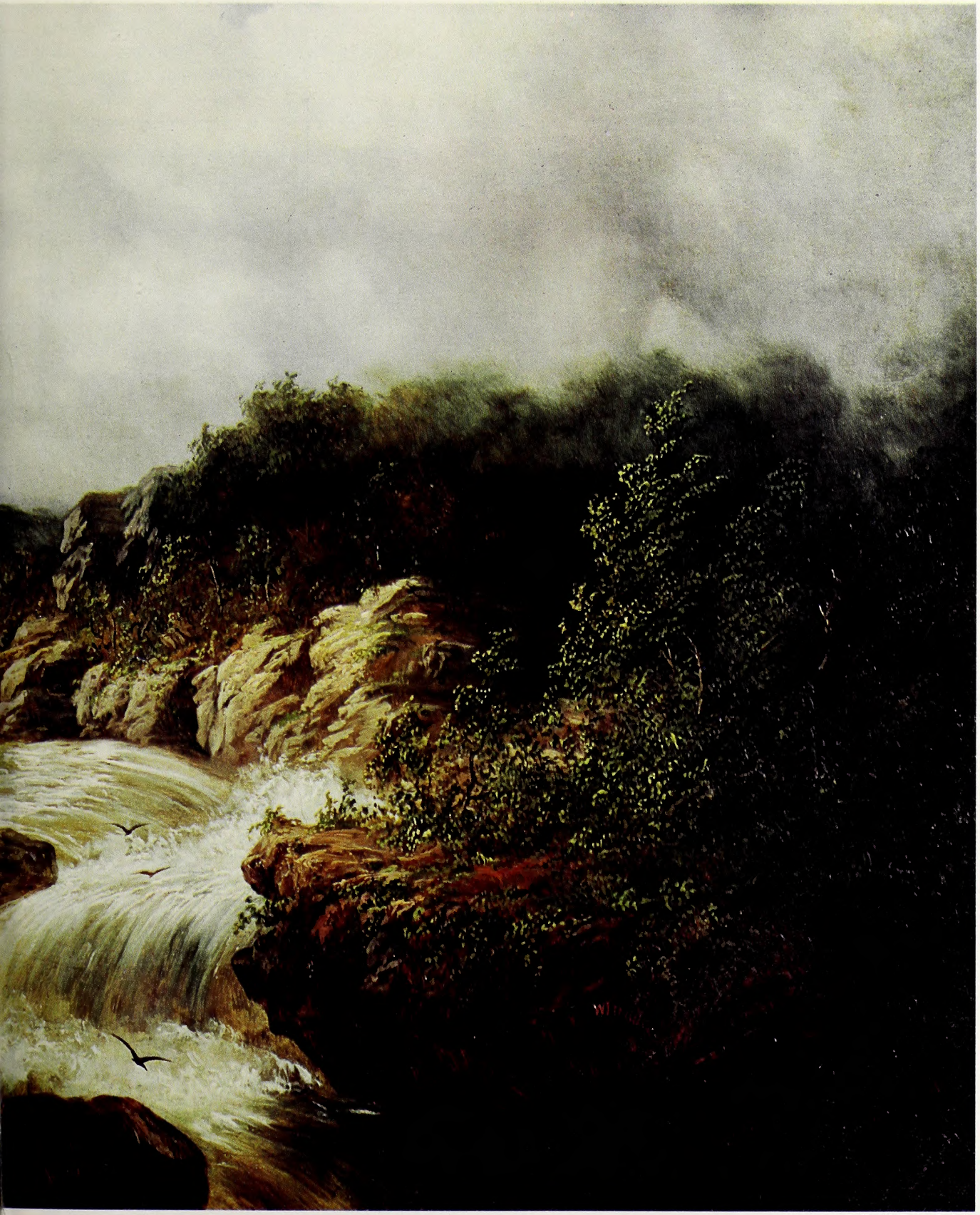
Though most works pictured on these pages are on loan to various state government agencies and affiliate galleries, more than 80 percent of the North Carolina Collection is, at any given time, in storage because the present museum building is just too small for adequate display. Through an appropriation of $10.75 million by the General Assembly, and through a campaign to raise $5 million from the private sector, a new, $15 million

Deer in Landscape

Deer in Landscape, Thomas Hinckley, 1813-1896
This fairly large canvas is dated by the artist, but the date is illegible. The Massachusetts born artist went abroad in 1851 to study Edwin Landseer and the Flemish masters. He often painted animals and two of his pictures of dogs and game were exhibited at the Royal Academy in 1858. Hinckley obviously knew his subject well, imparting "personality" to the deer, almost to the point of personifying the noble animal.

museum of art is under construction on a west Raleigh site. When completed sometime in 1980, this museum will be capable of exhibiting nearly four times as many works as the present outgrown facility.

The Hickory Museum of Art, Hickory, N.C., was founded in 1944 by Paul Whitener, an artist (now deceased) who lived in Hickory. A private museum, the Hickory Museum of Art Inc. has a collection that is mostly American, of the realist tradition, and dates for the most part from 1850 to 1950. Like many of the other



Falls of Tamahala

ocal galleries across the state, the Hickory Museum f Art has plans for a new building. Hickory's plans re well underway with a challenge grant of $150,000 rom the late A. Alex Shuford of Hickory.

Affiliate galleries like the Hickory Museum can borrow paintings and other art works from the North Carolina Museum of Art. Developed through a grant from the National Endowment for the Arts, the affiliate gallery program has been designed in cooperation with the local galleries as a means of expanding local collections.

By Duane Raver

The Trout Fisherman John Mogford 1821-1885
This English artist painted this idyllic scene (which is likely somewhere in the British Isles) in 1856. It has been lent to the North Carolina Museum of Art at Raleigh on occasion.

Storm Over the Blue Ridge

The Trout Fisherman

Storm Over the Blue Ridge, William Charles Anthony Frerichs, 1829-1905

Frerichs was born in Ghent, Belgium, but emigrated to America about 1852. He first settled in New York where he became known as a portrait painter, but moved to Greensboro, N.C. in 1854, where he taught art until 1869, at which time he moved to Staten Island, N.Y. He apparently traveled in the mountains of North Carolina, painting several scenes of the area, including this one and *The Falls of Tamahaka, Cherokee County, N.C.*, Both are from the State Museum of Art, Raleigh.

Fishing A Bayou, George Pearse Ennis, 1884-1936

Although no firm date is assigned to this painting, nor any specific location, it was likely done around the turn of the century, perhaps in Louisiana or Florida. Ennis was born in St. Louis and educated in Chicago and New York. As director of the Sarasota School of Art in Florida he did several works with a deep south flavor. In the freedom of his oil technique and use of strong colors, he expresses the breadth of the outdoors and the boisterous activity of the fisherman's life. This painting is on exhibit at the Hickory Museum of Art, in Hickory, N.C.

Fishing A Bayou

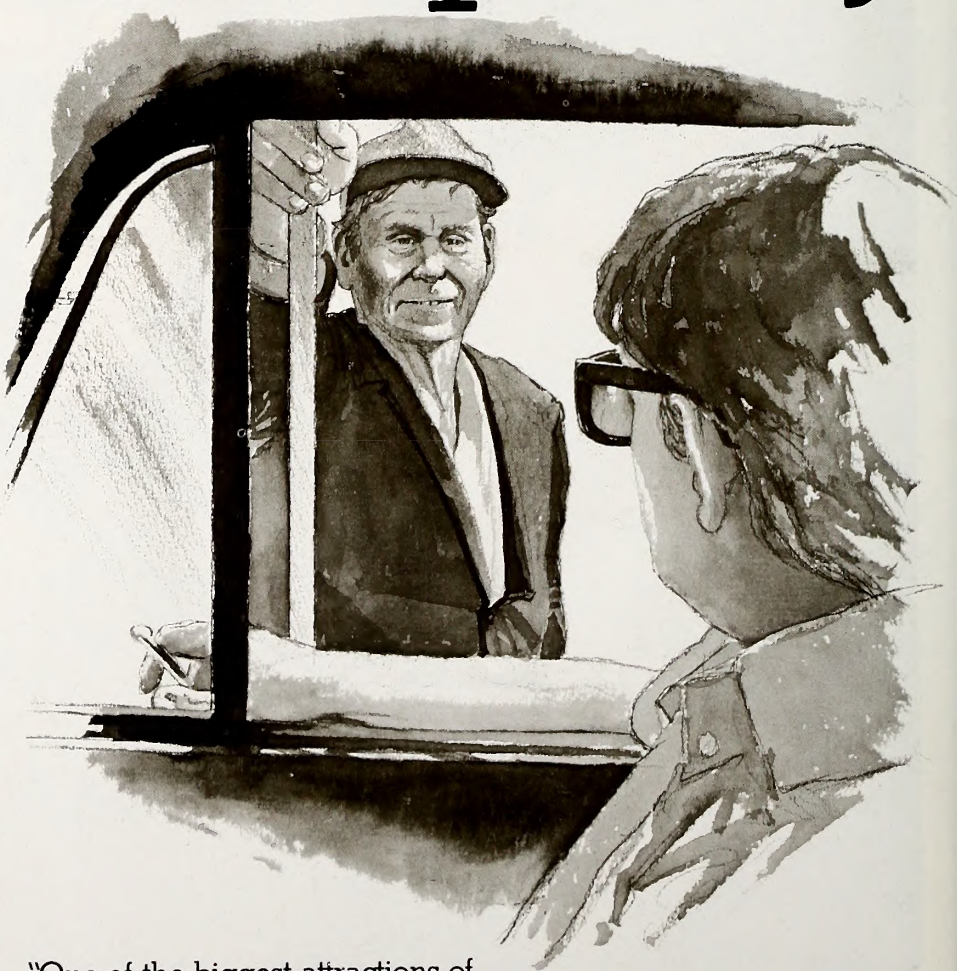
by Mark Taylor

Busting The Great Wildlife Conspiracy

Jake walked over to the cooler, got himself a cold Dr. Pepper, and sat back in his chair behind the counter. Man, but it was hot. The sweat rolled off his back, no matter how little he did, and the cold drink didn't help any. A car turned into the driveway of the tackle shop, and he watched it with idle interest. A man got out with longish hair and sunglasses; hard to say how old he was. Then a young girl got out of the other side, sort of cute and blond, a real headstopper. Jake perked up. He was a sucker for a pretty girl.

The two folks came into the store and made small talk with Jake for awhile before asking if they could put their canoe into the river behind the shop. They were from the University up at Chapel Hill and were just wandering around down near Lake Waccamaw and the nearby beaches collecting handicrafts, talking to people, and doing a little canoeing. Jake liked them. They were friendly and it was always nice to talk to a pretty girl. He sold them some wooden bread trays, a couple of drinks from the fridge at his trailer across the road, and told them where they could buy some fish. Illegal fish. They seemed okay to Jake, but he wasn't about to put his neck on the line selling game fish to someone he didn't know; so he sent them across the street to his neighbor. His neighbor sold them fish; and if nothing happened after awhile, Jake figured it would be okay to do so too. He hoped they'd be back.

They came back. They showed a lot of interest in the dugout canoes Jake



"One of the biggest attractions of fish poaching is that it brings in a lot of money for virtually no outlay."

sold and were basically ignorant city folks. Asked a lot of questions, bought a fair amount of soft drinks, and bought a lot of fish. Jake was soon selling to them regularly, and looked forward to their visits. The pretty girl was always snapping away with her camera at any fool thing Jake did. After awhile he didn't pay any attention to it.

It was probably the biggest mistake he'd ever made.

The cute young girl was Cindy Delaney, an agent of the U.S. Fish and Wildlife Service. She had all kinds of uses for those pictures later on when she testified in court against Jake and other fish poachers. Her "boyfriend" was John Kennedy, a wildlife enforcement officer for the N.C. Wildlife Resources Commission, and an assistant supervisor in the Enforcement Division. A $25 wig, sunglasses and blue jeans altered John's appearance enough so that no one ever questioned his identity. Together, the two undercover agents arrested a total of 33 people in North Carolina for 106 different wildlife violations, ranging from illegally selling game fish and deer, to conspiracy to commit a misdemeanor. Their investigation also spilled over into South Carolina where seven people were convicted on 10 similar charges.

Contrary to what many people believe, there is not a love-hate "fox and roadrunner" relationship between wildlife agents and professional poachers. John Kennedy has no use for them at all.

"Commercial fish and game poachers can be dangerous people," he said. "One of the men we were dealing with was a convicted murderer. These types of people are often involved in a lot of other illegal activities, including bootlegging, gambling, illegal sale of liquor, and all kinds of game violations. People who live near them are generally scared of them. A lot of them tend to be bullies, and they're clannish and stick together. It's not like Baretta. All in all, they're usually a pretty scummy bunch of characters."

John Kennedy and Cindy Delaney obtained convictions against 26 different fish poachers in southeastern North Carolina. The men would usually make big catches of fish at night using an unweighted gill net, or would place fish traps in the narrow channels of the river that winds into a lake. One fish poacher boasted to

"His neighbor sold them fish; and if nothing happened after awhile Jake figured it would be okay to do so too."

Kennedy while he was working undercover that "all the wardens are dumb and don't have a chance to catch us."

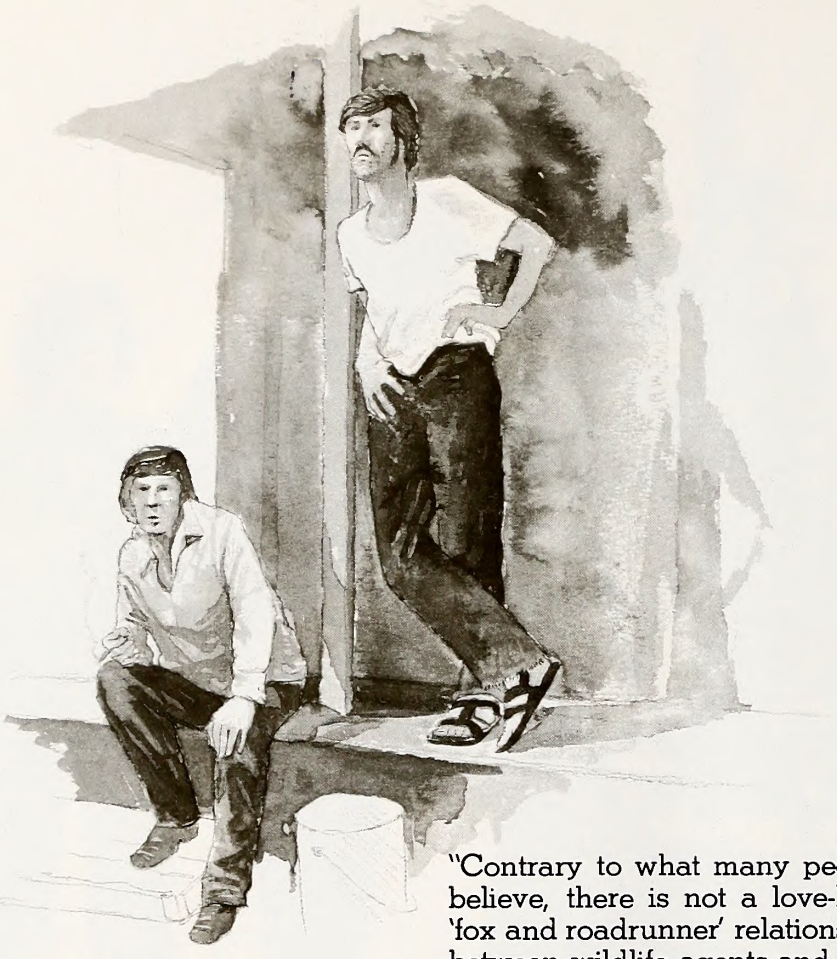
The same man told Kennedy that when he planned to go gill netting on the lake, he'd have a friend call up the area wildlife enforcement officers and tell them someone was firelighting deer in a distant area. After netting or trapping the fish, the poachers would hold them in wire boxes that would be placed underwater and retrieved whenever they made a sale. The tackle shop where "Jake" worked had an artesian well that fed a special holding enclosure where live fish were kept. Jake tried to keep about 125 pounds of live fish on hand at all times.

"One of the biggest attractions of fish poaching is that it brings in a lot of money for virtually no outlay," said Kennedy. "And it's all tax free. Jake's place had about 10 fishermen supplying him with fish. Some were gill netters; others were regular fishermen. He'd give them a little money or liquor, and that kept them happy. A lot of them were bums who didn't work and collected welfare, but used fishing for recreation and to supplement their income."

Most of the fish John and Cindy bought sold for $1 and $1.50 per pound. On one occasion they purchased fish for a fish fry they claimed they were holding at Myrtle Beach for 70 people. Jake had no problem getting them the 125 pounds of fish they needed, and confessed that "fish sold like hotcakes." It was all he could do to catch enough to keep up with the demand.

One man who wildlife agents have caught several times in the past, but haven't been able to catch recently, regularly brings about 700 pounds of

illustrated by David Williams



"Contrary to what many people believe, there is not a love-hate 'fox and roadrunner' relationship between wildlife agents and professional poachers."

bluegills down to his market from northeastern North Carolina and sells them for about $1 per pound.

"He only sells them to a handful of friends he's been doing business with for 20 years or so; so it's almost impossible to catch him," Kennedy said. "There's no maximum limit on the number of bluegills you can have in your possession; so there's not really much we can do except use undercover methods. It takes him about two days to catch the 700 pounds of fish and he does it once a week for about eight weeks. At $1 per pound, all tax free, that's quite a bit of money he's making."

Working undercover also has its bad moments.

"I was always scared that someone in the tackle shop would recognize me because I've worked for 20 years in eastern North Carolina, and was working in my home territory," Kennedy said. "A lot of these people had seen me in uniform, but the wig and sunglasses and plain clothes did the trick. One time, Cindy and I went to buy fish from a guy who was a convicted murderer. We went in his trailer and Cindy and the guy's wife went into another room to look at an antique sewing machine. He wanted to show me some of his guns; so he got out this old rifle and started waving it around. He was drunk, as usual, and the barrel was waving every which way. I told him to put the gun down because I thought it might be loaded, and he said, 'heck, it ain't loaded' and squeezed off three shots through the front door. Cindy thought I'd been killed for sure."

The Waterside Sportsman's Club stood on the banks of the Pee Dee River, adjacent to the Pee Dee National Waterfowl Refuge. To call it a "sportsman's club" is a joke. Gimp, Tommy and a few other hunters regularly went there to drink, fight, gamble illegally and get a snoot full before going out to shoot anything that moved.

They were surprised when a guy came in with a good-looking chick one day wanting to know where to find arrowheads. A few of the hunters told him some likely spots, and he and the girl left. That night they came back — their carpenters' aprons full of spear points, flint knives, broken pieces of clay pipes and other relics. The hunters, genuinely interested in their find, interrupted their gambling and drinking long enough to look over the relics the newcomers had brought in, and pointed out other likely spots to search. The people kept coming back, and after awhile they were accepted as regulars at the club. Not long after, someone came in with a deer he had shot for sale. The guy and his girl bought themselves a shoulder of venison, and soon were steady customers.

Again, the guy and the girl were John Kennedy and Cindy Delaney. After they had finished working on the fish poaching problem at Lake Waccamaw, the refuge manager at the Pee Dee National Wildlife Refuge had requested some help from the U.S. Fish and Wildlife Service and the N.C. Wildlife Resources Commission to control illegal hunting in and around the refuge. Both agencies decided that the best way to attack the problem was from the inside.

"The first day we were in the refuge we ran into a guy who was connected with the bunch at the Waterside Sportsman's Club," said Kennedy. "He told us about the club and he gave us the name of a member who was an avid collector of Indian artifacts, and who might be willing to sell us some deer meat."

Kennedy and Delaney arranged to visit this man under the pretense of viewing his collection of Indian artifacts. "He was very knowledgeable when it came to the Indians of this area, and gave us a lot of help," smiled Kennedy. "Soon we were buying a lot of deer meat from him and others in the club."

The deer sold by some of the club members were taken by a variety of methods. Some were jacked at night using a spotlight, others were shot legitimately during the hunting season, and still others were taken either before or after the season had closed. One favorite method these poachers had of killing deer was to drive them into the water with dogs, then shoot them from a motorboat.

"A lot of these guys were hunting 18 hours a day," Kennedy said, "using legitimate methods during the day and in season, then hunting at night. One man had been enrolled in a vocational college, but dropped out during the hunting season to poach

deer. Most of them weren't working and were collecting some sort of welfare or unemployment compensation while they hunted. The poachers would each take 15 to 20 deer during the season and sell them for $30 to $50 apiece. They all had a ready market for this meat, and often had it sold within a few hours after they'd shot it."

"The deer hunters were a rough bunch of characters," Kennedy continued, "and I was somewhat nervous when we were working with them. Although it's funny, they were honestly interested in Indian artifact collecting. They were usually armed and had been drinking when we were in contact with them. A lot of times they'd also be cut up pretty bad from fights they'd had with each other. I was real glad when we were finished with them because I think that sooner or later they might have turned on us."

As a result of the investigation conducted by Kennedy and Delaney, the club was ultimately shut down. In addition to the game violations, prosecutors revoked the owner's beer license and could have prosecuted him for allowing illegal gambling.

After the court trials, the clubhouse was sold, the offending members kicked out of the club, and the legitimate members started from scratch.

"There were some good people in that club, but it was being run by the bums," Kennedy said. "The good people were physically afraid of the outlaws, and were also afraid to speak out because if they did, they'd lose their place to hunt. Now things down there have straightened themselves out."

Although game fish and deer were the targets of the undercover investigation, they were not the only animals being taken by the poachers. Many of the fish poachers also had ducks in their possession which had been illegally trapped. The undercover agents also saw beaver, alligator skins, wild turkeys, and other illegally taken game in many of the freezers the poachers used to store their meat in.

"This is the first large-scale undercover operation we've tried, and it worked out very well," said Kennedy. "The uniformed wildlife officer has his place, but there is no way that he can get to the heart of a market hunting operation. To do that, you have to work from the inside. After it was over, a lot of sportsmen and court officials in the area congratulated us on it. These sportsmen said they knew commercial poaching was going on, but always felt as helpless as we were to do anything about it; so they never complained. Well, we're not helpless anymore." ⬍⬍

"I told him to put the gun down because I thought it might be loaded. He said, "Heck, it ain't loaded," and squeezed off three shots through the front door."

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA, and interviewed John Kennedy, assistant wildlife enforcement supervisor of District Four, to get this story.

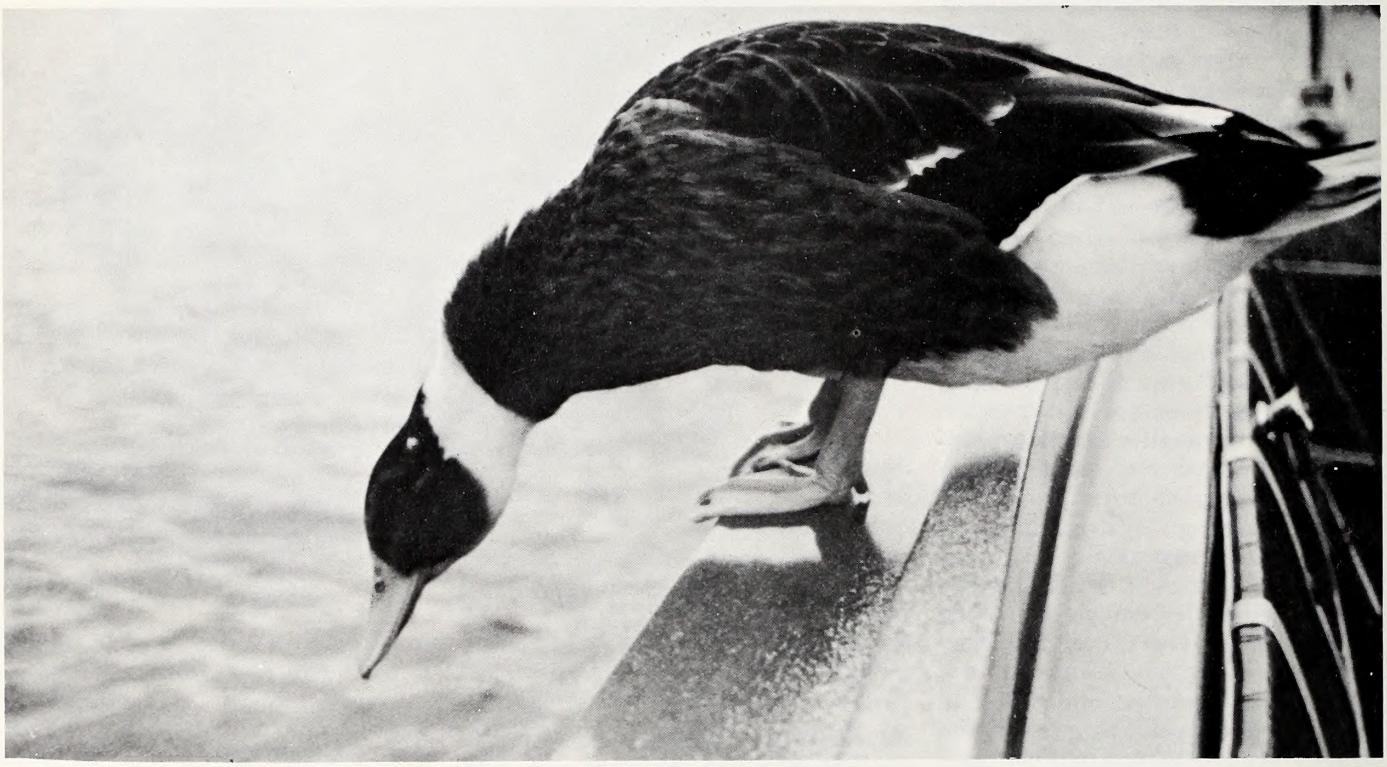
Although many people think of market hunting as an era that has passed, it is plainly making a comeback, as John Kennedy's experiences show. In 1977 the N.C. Wildlife Resources Commission's Enforcement Division made 473 arrests for night deer hunting, a record high for the Commission and an eight percent increase over the previous year.

"For the past three years, commercialization of game and fish has been more prevalent than it's been in years," Don Curtis, chief of the Commission's Enforcement Division commented. "When the price of beef rose dramatically and the unemployment rate went up, people turned to wild game for food. An illegally killed deer carcass usually sells for about $35, and this figures out to about 35 to 40 cents per pound. With illegal fish, the situation is different. Bluegills sell for up to $2 a pound scaled and filleted, while people can buy commercially taken saltwater fish for much less. Still, the popularity of buying and selling game fish is still on the rise."

THE DUCK THAT POINTS FISH

"FUDGEY" ZEROS IN ON BASS LIKE A BIRD DOG

BY TOM HIGGINS



It's not that Hubert Greene needs any help catching fish. During the past several years, the Spindale marine dealer and operator of a tackle shop on Lake Lure may have accounted for more trophy-sized bass than any other Tar Heel. His recent record, for example, includes a 14-pound largemouth and a five-pound smallmouth to go with a wall full of earlier lunkers.

But Greene is getting angling assistance nowadays from a most unusual source — Fudgey, the duck. The what? You read right.

Fudgey is a part mallard duck that points fish in much the same fashion that a good bird dog freezes on a covey of quail. Allegedly so, at least.

"From what I've seen so far, starting last summer, I'd just as soon have him as an electronic depthfinder or any of the other gadgets freshwater fishermen are using nowadays to catch bass," proclaims Greene. "It's true, but I can't blame anyone for not believing it without seeing it. I didn't believe it either to start with, but Fudgey has found fish for me too many times for it to be a fluke.

"Our children, Todd and Sandy, found Fudgey lost one day on the shoreline at Lake Lure," explains Greene. "After about three days we located his mother, but she wouldn't have anything to do with him anymore. So my wife, Rose, adopted him. He got his name because Todd said he looks like fudge ripple ice cream, being sort of white and yellowish-brown.

"We became very attached and Fudgey started going on fishing trips," says Greene. "When I was working a bank one day he jumped out to swim alongside the boat and just froze at this one spot. I cast over there and got a nice fish. That kept happening. I had wondered what the duck would do if it ever spotted a really big bass below him. I found out at Nantahala Lake. Fudgey was swimming by a tree that had fallen into the water and suddenly panicked. While he hustled to the boat I cast a spinner bait over there and caught an eight-pounder. The same thing happened at another similar spot later in the day and this time the largemouth went 10 pounds.

Understandably, Fudgey now enjoys celebrity status around Greene Marina in Spindale, despite the fact that he's not housebroken.

"You have to watch your step around here sometimes," said Greene. "Even so, Ol' Fudgey has no worries. I've heard the story about the guy who killed the goose that laid the golden egg." ◆

Tom Higgins is outdoor editor for the Charlotte Observer, and a well-known sportsman throughout both Carolinas.

Back of the Book

For Turkey Restoration Work!

Wayne Bailey Wins Conservation Award

Wayne Bailey, assistant supervising biologist for the North Caroline Wildlife Resources Commission, recently won the 1977 Wild Turkey Conservationist of the Year Award from the National Wild Turkey Federation.

"This award is basically our 'Man Of The Year Award' for anyone involved in turkey restoration work," Tom Rodgers, executive vice president of the National Wild Turkey Federation explained. "It goes to the person who has been most active in turkey conservation nationally, and who has contributed most to the federation."

Bailey was the first charter member of the federation, which is composed of turkey hunters and wildlife officials dedicated to restoring the wild turkey. In addition, he has served on the federation's Board of Directors and Technical Committee, as well as doing a lot of writing for the federation's official publication, "Turkey Call Magazine." Recently, with the cooperation of the North Carolina Wildlife Resources Commission, Bailey prepared a bulletin for the federation entitled "The Status and Future of the Eastern and Florida Wild Turkey" which will be published soon.

Bailey has also been active in wild turkey work in North Carolina and other states since he became head of the Commission's wild turkey program in 1970.

"The population of wild turkeys in North Carolina was probably at its lowest point when I came on board in 1970," he said. "I'd estimate that the population then was somewhere between 5,000 and 6,000 birds. Now we've probably got between 6,000 and 7,000 birds in the state. Since 1970, we've stocked 19 sites, with 16 of them being in the mountains."

Bailey has also given technical assistance to Ohio, Illinois, Massachusetts, and New Hampshire in their wild turkey restoration programs.

Currently, the national population of wild turkeys is around 1¼ million birds, according to Bailey. The only states that do not have any wild turkeys are Rhode Island, Delaware, and Alaska. Because of the work done by state wildlife agencies, the National Wild Turkey Federation, and interested sportsmen and conservationists, several states that didn't originally have wild turkeys now have populations of the birds. These states are Hawaii, Oregon, Washington, Utah, and Nevada.

According to a report recently released by the U.S. Fish and Wildlife Service, there are now 1¾ million wild turkey hunters in the United States, about double the number of turkey hunters there were five years ago.

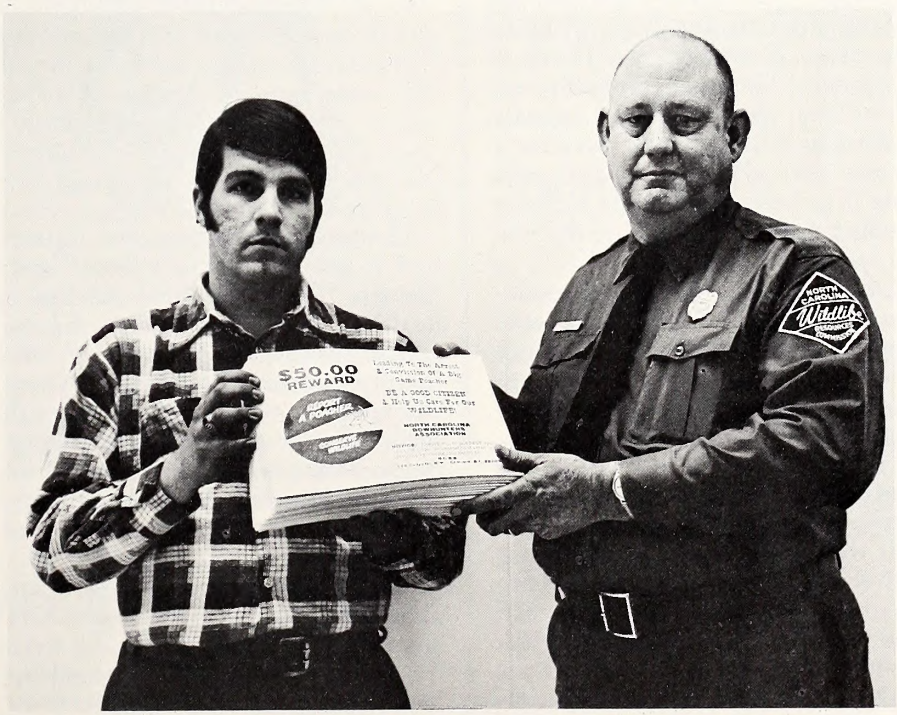
January Enforcement Report

For the month of January, 1978, the North Carolina Wildlife Resources Commission checked a total of 15,921 hunters and fishermen and 435 boaters.

Of the hunters and fishermen, 1,069 were prosecuted and 926 convictions were obtained. The total fines collected tallied up to $21,558 and the total costs collected were $20,294.

Of the boaters, 113 prosecutions were made and 88 convictions obtained. Total fines collected tallied up to $267 and total costs collected were $2,052.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.



The North Carolina Bowhunters Association has decided to take a step to help halt big game poaching. They're offering a $50 reward to anyone offering information leading to the arrest and conviction of a big game poacher. Here, President of the Association, Jack Smith, presents Don Curtis, chief of the North Carolina Wildlife Resources Commission's Enforcement Division, with some signs publicizing the program.

Bucks Only Laws!

A Tool That's Outlived Its Time

"I say a man who would shoot a doe ain't hardly a man at all. I can remember when there were hardly any deer in this county, now there's all kinds of them. If we allow hunters to shoot does, we'll lose our herd again."

"The blasted things are eating me out of house and home, I've seen hundreds of them down in my soybean fields at night. I can't afford to take the kind of losses they're giving me."

Ask a farmer and a hunter in eastern North Carolina what they think of the deer situation there and these two opinions are bound to crop up. The eastern part of the state has a deer problem, not a lack of the animals, but a herd that is way too large for the natural carrying capacity of the land. As a result, many hunters are having little or no problem taking their limit of deer, firelighters are prospering, deer are starving, and farmers are losing thousands of dollars in crop damage annually.

"We had a total of 1,734 deer killed under depredation permits last year," said Grady Barnes, assistant chief of the N.C. Wildlife Resources Commission's Division of Game. "This was probably nowhere near the number of animals that were actually killed, because a farmer may shoot an animal anytime it is destroying crops without needing a permit. I imagine the real kill was much higher."

Of the deer taken under depredation permits, the lion's share came from District 2, with 1,000 animals killed. The majority of these deer problems are in the eastern counties, east of Highway 95.

"There are two reasons for our depredation problems," said Barnes. "One is the change in agriculture that we're practicing and the other is that in some areas deer herds are way too large, due to underharvest. The problem boils down to the lack of either-sex seasons in many areas.

The chief target for deer depredation is soybeans, which have only been planted extensively for the last 15 years or so.

"Most damage done by deer to soybeans is early in the spring," said Barnes. "When the plants first push their way up out of the soil, the deer will walk right down the rows biting off the top of each plant. This kills the plant, and I've seen five-acre fields completely destroyed. I've talked to farmers that have lost well over a thousand dollars to deer damage, and have heard rumors of some big farms losing $5,000 or more. They can't afford to take this kind of loss, and what I'd like to see is the herd size reduced in these areas. It would be better for everyone, including the deer."

The overabundance of deer falls right back onto bucks-only laws. In three counties in the east where deer damage is highest, county laws prohibit the taking of antlerless deer. The Wildlife Commission is currently powerless to rectify the situation because it cannot override the local laws.

"Antlerless deer laws are a good tool to use to build up a herd," said Barnes. "Once the herd reaches a healthy size, either-sex hunts should be allowed or the herd will rapidly outgrow its habitat. When the deer can't find enough natural feed, they'll turn to destroying crops, which is what's happening in the east. Hunters just don't understand how fast a deer herd can increase."

Indeed they don't. A deer herd can almost double in size every year. On the average, an adult doe will bear 1½ fawns per year, and in a healthy herd, many will bear twins. Antlerless deer hunts in North Carolina usually take only about 10 percent of the herd, either-sex hunts will take 20 percent of the herd, and the Commission is aiming for a harvest of about 30 percent of the herd in these overpopulated areas according to Barnes.

"You can take an area that has virtually no deer and have a huntable population within five years with a bucks-only law," Barnes explained. "Even with either-sex seasons, you're still leaving room for a healthy increase in the herd. If you don't thin the animals out, soon you'll start having problems with overpopulation."

The herds in some places in the east have, for some time, been showing signs of overpopulation.

"In certain areas, we have had deer die-offs," Barnes said. "What happens is that when the deer populations reach a high point, disease and parasites will knock them down to a very low point, so there are almost no deer in that area at all. What we want to do is maintain healthy moderate populations, instead of having boom and bust situations. In a healthy deer herd, the average weight for a buck will be between 125 to 175 pounds, and does will run from 80 to 130 pounds. In an overpopulated area, like the east, bucks will average 100 to 130 pounds and does will run from 65 to 80 pounds."

"Hunters who are worried about either-sex seasons should look at some other areas in North Carolina and they'll see they do no harm," Barnes continued. "Our biggest deer with the best racks usually come out of Wake and Chatham counties where the herd size doesn't exceed the carrying capacity of the land. During an either-sex season in Halifax County, a hunter shot a doe that had three embryos in it. He was upset that by doing so, he'd hurt the herd. What I tried to tell him was that if it weren't for either-sex seasons, the deer never would have had three embryos to start with."

Other states that have had bucks-only laws and refused to discard them have learned the same bitter lessons that North Carolina is facing now. In certain northern states, like Michigan and Vermont, where doe shooting is prohibited, more deer fall to starvation in a bad winter than to the hunters' guns. The antlerless deer law is a good tool, and like all good tools, after it has served its purpose it should be laid aside. It was never meant to become a way of life.

—Mark Taylor

Jack Miner, The Man And His Work

Readers of WILDLIFE IN NORTH CAROLINA must be a cosmopolitan lot if the responses from our inquiry on the Jack Miner leg band photo are any indication. We received letters from Ontario, Quebec, Michigan, Ohio, Massachusetts, and points in-between. Due to space limitations, we can't print all of these answers, so we've taken information from those we received to give you an idea of who this amazing man was. And thanks for writing.

You could say that Jack Miner was a "born again" market hunter. When he was a young man in the 1870's, times for his fatherless family were hard and he turned to one of the few occupations open at that time — market hunting for waterfowl. Together he and his brother were able to keep the family in food by gunning the marshes around Kingston, Ontario, for the big Canada geese that migrated south from Hudson Bay every year.

When Miner reached manhood, he and his brother turned to more profitable endeavors and opened a brickyard. The yard prospered, but when Miner saw the abandoned clay pits full of water, he couldn't help remembering the huge flocks of geese that had once visited the area. In the early 1900's, he decided to do something about it.

In 1904, Miner opened his first sanctuary. It was an old clay pit, and he had two geese with clipped wings. He released the geese and added a few more each year. The first geese ever to return to his sanctuary came in 1908, when 11 of them stopped in. In 1909, he started banding geese, and his operation began to pick up speed. In a few short years, birds were visiting his sanctuary by the thousands where they were free from heavy hunting pressure and had plenty of food and shelter.

Miner was also a religious man and his trademark was the biblical inscription that he inscribed on every band. He probably had his greatest spiritual influence among the Indians and Eskimos of the Canadian Arctic. They would bring in the bands from the birds they had killed and give them to the local missionaries who acted as collection agents for Miner. In return, the missionary would bring the band into his church the following Sunday, display it to the congregation and mention the name of the hunter who had obtained it. He would preach his sermon from the scripture lesson on the band. It was a promotional device that couldn't be beat, and Arctic missionaries and natives became some of Miner's biggest supporters.

Jack Miner's contributions didn't stop with the spiritual enlightenment of waterfowl hunters and Arctic natives. He ran the first comprehensive bird banding program in North America, and by charting the paths of waterfowl migrations, he convinced the governments of the United States and Canada to regulate waterfowl together. It was the start of a partnership that has been one of conservation's greatest success stories.

Jack Miner died in 1944, but his work lives on today. His three sons still run the Jack Miner waterfowl refuge, and organizations like Ducks Unlimited are buying up the Arctic breeding grounds he loved so well. From a duck's point of view, he was probably the finest market hunter that ever lived.

—Mark Taylor

Research For Endangered Species

At its meeting on December 8, the N.C. Wildlife Resource Commission's Endangered Species Advisory Committee gave first priority approval for research proposals on the red-cockaded woodpecker, the American alligator, and the brown pelican. The first two projects would be conducted by N.C. State University at Raleigh and the third by the University of North Carolina at Wilmington. Each study would span a period of several years and determine distribution and status of the species in North Carolina as well as identify habitat requirements and measures necessary to insure survival and population enhancement.

Second priority was assigned studies on the peregrine falcon, Indiana and gray bats, and the Neuse River waterdog. Also included in this priority was a public information program on endangered species. All of these projects were proposed by the N.C. State Museum of Natural History. Studies of the panther and manatee, also proposed by the Museum, were given a third priority. Each of these programs is to be funded by the U.S. Fish and Wildlife Service, with state matching money provided by the agency conducting the program.

—Frank Barick

Seamanship Course Slated

The U.S. Coast Guard Auxiliary will conduct a 13-lesson Boating Skills and Seamanship Course starting on April 11.

The course will meet on Tuesday and Thursday evenings from 7:30 to 9:30 p.m. at the Technical Institute of Alamance's Annex in Graham.

The course will cover all aspects of safe boat handling .

Wild Turkey Season Opens

The season for wild turkey opens this month in various parts of the state. Only bearded birds may be taken, and the seasons are as follows:

The season is open from April 8-29 in and east of Rockingham, Forsyth, Yadkin, Iredell, Catawba, Lincoln and Gaston counties. Exceptions to this are Camp Lejeune, which has an April 8 to May 6 season, and there will also be no open season in Bladen, Brunswick, Columbus, Cumberland, Gates, Harnett, Hoke, Robeson, Sampson, and Scotland counties.

The season will be open from April 15 to May 6 in and west of Stokes, Surry, Wilkes, Alexander, Caldwell, Burke, and Cleveland counties.

One bird may be taken daily, two may be in possession, and a maximum of two may be taken per season.

Bass Tourneys Underway

The North Carolina Wildlife Federation is sponsoring some Bass Tournaments with a new twist. Team Environmental Invitational Bass Tournaments will be held on three lakes from April until July.

In addition to anglers trying to catch the most and largest bass, teams will have to bring in at least one container of garbage that they picked up around the lake. Teams bringing in more garbage will be given extra points, while teams with less than one bag of garbage will be penalized. All fish will also have to be kept in aerated live wells, and will be released alive after weigh-in. Substantial cash prizes and trophies will be awarded.

The tournament on Kerr Lake will be held on April 15. Registration will be on April 14 at the Howard Johnson's Motel in Henderson from 6 p.m. to 9 p.m.

The tournament on Lake Norman will be on May 6. Registration will be on May 5 from 6 p.m. to 9 p.m. and on May 6 from 6 a.m. to 7:30 a.m. at the Lake Norman Marina Inc. on Highway 150 at Reed Creek.

The tournament on Lake Hickory will be held on July 8. Registration will be at the Hickory Marine Sales and Service in Hickory on July 7 from 6 p.m. to 9 p.m. and at the Wittenburg Access Area on Highway 127 North on July 8 from 6 a.m. to 7:30 a.m.

For more information contact the N.C. Wildlife Federation, PO Box 10626, Raleigh, N.C. 27605 or call 919-782-5418. Sponsors of the tournament are the Duke Power Company, Virginia Electric and Power Company.

Approximately one-quarter million students have completed the Boating Safety Course since it was first introduced into schools in 1974. The Boating Education course teaches the fundamentals of safe boating to young people, often in junior high school, before dangerous operating habits are formed.

Unaka Mt. Naturalist Rally Slated

The 12th Annual Unaka Mountain Naturalist Rally will be held from May 5-7 in Erwin, Tennessee, sponsored by the Erwin Jaycees.

The event will feature hiking trips, guided bus tours, and examples of craft exhibits of the mountains.

For more information contact the Unaka Mountain Naturalist Rally, Jim Naylor, Chairman, Buffalo Valley Apt. 208, Unicoi, Tennessee 37692.

Conservation Retreat Scheduled

April 27-29 are the dates for the Spring Conservation Retreat sponsored by the American Forestry Association and the Extension Forest Resources Department at N.C. State University. High Hampton Inn, Cashiers, N.C., is the site of this year's retreat. Nineteen different subjects, all the way from archery to woodlands wildlife, will be taught by well-qualified instructors. This all takes place in a natural setting of springtime in the North Carolina mountains. For further information about this weekend of fun, education and fellowship for all ages, write: Conservation Retreat, Extension Forest Resources, School of Forest Resources, 3036 Biltmore Hall, N.C. State University, Raleigh, N.C. 27607.

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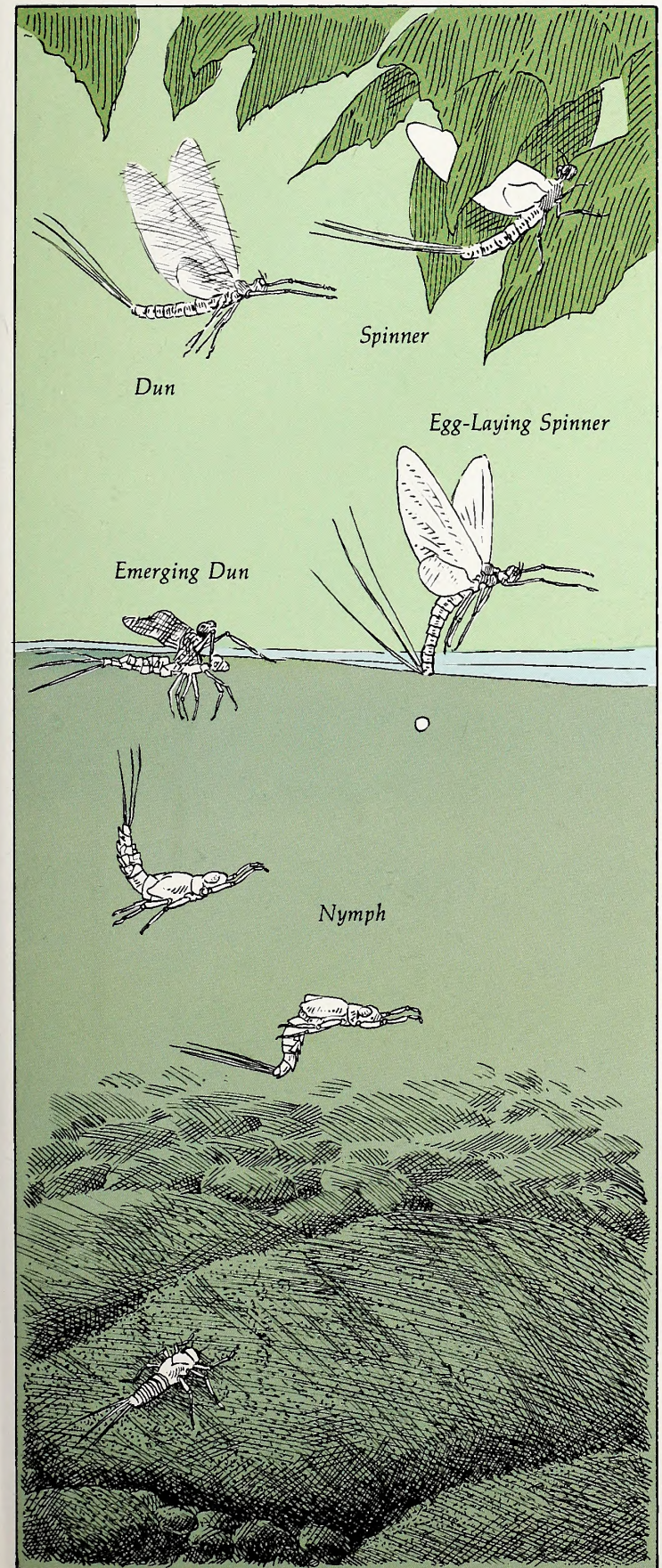
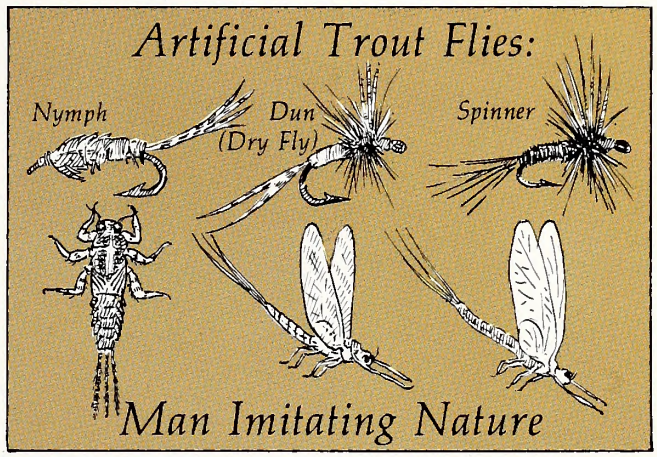
Jim Dean





The Incredible Life Of The Mayfly

It is not surprising that many trout fishermen become fascinated by the aquatic insects which live in streams. The artificial trout flies they fish with are designed to imitate the mayflies, stoneflies, caddis and other species that live not only in icy streams, but also in other relatively unpolluted rivers and lakes from the mountains to the coast.

The more than 500 species of mayflies have life cycles which go through four distinct stages: egg, nymph, dun and spinner. After hatching from the egg, the nymph will usually spend a year in the stream, clinging to rocks or plants or burrowing in silt or decaying vegetation. When water temperatures warm, usually in the spring, the mayflies of a particular species leave the safety of the stream bottom and rise to the surface where they hatch out of their nymphal shucks and ride the currents like little sailboats as newly emerged duns. So predictable are the hatches of certain species that fishermen can often predict within a day or so each spring when the first dun of that species will appear.

If a trout or bird does not eat them, the duns flutter off the water into the trees where they undergo yet another change within a few hours or days. The opaque wings of the dun become translucent during this metamorphosis, and at last the mayfly becomes an adult spinner ready for the final brief dance of life — and death.

Gathering in dense clouds over the stream, usually at dusk, the male and female spinners mate in mid-air. The females then dip to the surface to lay their fertilized eggs which fall to the bottom and the cycle of life begins again. Meanwhile, the adult spinners, their purpose fulfilled, fall to the water and die. Stoneflies and caddis, along with mayflies, constitute a major source of food for trout, as well as some other species of fish.

"A Trout Stream"

Worthington Whittredge (American)
1820-1910

Is it an expert angler with split bamboo fly rod, or farm boy with cane pole and earthworms? The magic of the trout stream is the same for either. A warm sun, cool water and willing fish make a combination hard to beat.

Painting from Hickory Museum of Art, Hickory, N.C.

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Our Natural Heritage

Clyde Patton, A Wildlife Legacy

by Jim Dean

illustrated by David Williams

When Clyde P. Patton was executive director of the North Carolina Wildlife Resources Commission, he was fond of saying that the Commission's goal was "more sport for more people; equal opportunity for all." Recently, this was officially adopted as the motto, and Patton's concept of how a wildlife agency ought to serve the people and natural resources of this state is firmly rooted in that statement.

Patton was the first executive director of the Wildlife Commission when it was formed in 1947, the agency having been hammered out in the Legislature through the efforts of countless sportsmen who were tired of the inefficient, politically dominated system that had preceded it. The idea — whose time had come — was to put wildlife management into the hands of professionals. Sportsmen strongly supported the move, and Clyde Patton was the man chosen to put it to the test.

For the official publication of the N.C. Wildlife Resources Commission to say that he was highly successful may sound suspect to some readers, but the record speaks for itself. In an era when directing a wildlife agency has often had job security akin to coaching professional football, Patton displayed a remarkable talent for guiding his agency through the pitfalls without sacrificing good wildlife management principles. When he stepped down in 1976 (he still lives in Raleigh and is active in wildlife affairs), he had served longer than any other director in a similar post in the nation.

During this period, Patton built a strong agency, supported by license dollars from sportsmen and based on a "Five-Point Program" he originated. Enforcement, Management, Research, Education and Regulation were all important, and all forms of wildlife — both game and nongame species — profited. It is no accident that many species have grown in numbers and spread during this period, including some which might have been endangered today without such attention.

Under Patton, the state's wildlife enforcement officers (then called wildlife protectors) became a highly trained unit, recognized as the best such outfit in the country. Likewise, Patton's early interest in an active and effective farm game program led to such innovative, and still available practices as growing wildlife foods (at Hoffman in the Sandhills) and providing them free to farmers. Technical assistance was also provided free, and many upland game research and management projects were undertaken over the years. So successful and advanced was this overall program that other states are now widely copying it.

Patton also spearheaded the present Game Lands Program which increased the acreage of intensely managed wildlife habitat from some 700,000 acres to over two million acres. Again, in an age when public hunting and fishing lands are shrinking in most states, North Carolina is ahead of the game with a growing program that will ensure that present sportsmen, their children, and their grandchildren have a place to pursue their pleasures.

Patton came to North Carolina from the Virginia Commission of Game and Inland Fisheries in 1947 where he was head of the conservation education program and edited "Virginia Wildlife." A native of West Virginia, he graduated from Virginia Polytechnic Institute with a B.S. in Biology. Prior to his brief tenure with the Virginia Commission, he worked at the Lake Mattamuskeet Migratory Waterfowl Refuge, and later was a field biologist with the N.C. Division of Game and Inland Fisheries.

Patton was not a back-slapping good old boy who would jabber for hours on trivial subjects. He rarely wasted words, and he could be a stern customer when the need arose.

"One thing about Clyde Patton was that a lot of people underestimated him when they first met him," one old-timer recalled. "You'd think he wasn't listening to you, or that he just simply didn't understand what you were getting at, but just about the time you figured his mind was a thousand miles away, he'd ask you a question that showed you he was at least four steps ahead of you. You quickly learned to respect his grasp of any situation."

Respect. That is the term most often used to describe Clyde Patton, and it was the term also used by other envious state agencies across the nation to describe the efficient wildlife program he fathered. Those of us who are here now hold the reins Patton held, and we also hold the respected legacy he left for all of us — wildlife employees, sportsmen and nature lovers alike.

WILDLIFE IN NORTH CAROLINA

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Raccoons often live near water, and a significant part of their diet is comprised of crustaceans, mussels and other aquatic species.

Back Cover *By Barbara Harding*

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Curtis Woote

Karl Maslowski

The blue-gray gnatcatcher (opposite page) has built this distinctive nest in a sweetgum tree. The young will be cared for here until they're ready to fly. These gray fox kits (left) are taught not to venture from the den without one of the parents. Discipline is essential for survival. This fast-growing family of egrets (below) requires almost constant feeding during the first week or more of their lives.

Killing With Kindness

Hands Off" Is The Best Policy For Young Wildlife.

y Curtis Wooten

A half dozen shorebirds rose eluctantly from the low spoil land near the intracoastal water- ay as the skiff came to rest on the arse sand with a crunch. "Terns," noted, as I grabbed my fishing rod nd headed for the other end of the land. There were some good sand ats there where I'd always had ood luck picking up a few ounders in the past. I'd always ought of the area as my "ace in e hole" when the fish weren't ting elsewhere in the sound.

A dozen or more of the graceful rns and a few oyster catchers se from near the dome of the land as I walked to the water's dge. They hovered, screeching, at le's length above me as I passed, en promptly settled back down gain. Unusually bold today, I ought to myself for a fleeting oment before I realized what was

Joel Arrington

happening. I turned, took a few steps up above the high tide line and searched the sand and shells between the sparse shrubs and grasses. Sure enough, there, in a light indentation, lay the superbly camouflaged, nickel-sized egg of a common tern. A close scanning of the area turned up several other eggs and a couple of tiny young chicks. The adult birds hovered and swooped above, screeching their disapproval of my presence; so I retreated to the skiff, content to fish my "ace in the hole" from the boat. To disturb the birds and keep them from their eggs and young too long might make them abandon the area or cause the eggs and young to die from exposure.

It was early May, the middle of spring, so to find bird nesting in the area should have been expected. May is the peak nesting month for birds in North Carolina — be they shore, upland or song; and along with the months of April and June, it is also a time for the birth or first appearance of many other species of wildlife as well.

It is no coincidence that this is the season when large numbers of people are taking to the forests as well. Campers, hikers, fishermen,

Very few fawns or other wildlife are "abandoned" by the parents. This young white-tailed deer (right) is under the watchful eye of its mother. The finding of food is today's lesson for the infant raccoon (below). Like most babies, this young, red-tailed hawk (opposite page) is always hungry.

Gene Hester

Rex Sch

picnickers and a host of others take to the outdoors in force to shake the shackles of winter — to enjoy the freshness of spring breezes, the subtle greens of emerging vegetation, the anticipation of sighting wild animals and their young, and for a myriad of other reasons. It is inevitable that many encounters between people and young wildlife take place because favorite recreation areas for people are often the same areas where wildlife rear their young. Fortunately, most of the resulting encounters form pleasant and exciting memories for the people involved, and hopefully, aren't too traumatic for the wildlife.

Some encounters however, turn out disastrously for both parties. In most of these cases, the "disaster" is the result of people picking up wildlife babies thinking they are lost or have been abandoned by the parents. In most cases, they have not. The parent is usually foraging for food nearby or waiting for the danger to pass before moving the young to a safer location.

At times, however, nature seems to assemble every adversity at its disposal to ensure that the fittest, and only the fittest, survive. Spring storms, with their torrential rains and high winds, are particularly rough on young wildlife. High winds often dislodge even the most firmly attached tree nests; and if the resulting fall doesn't kill the young birds, exposure to the elements and predators most often does.

Heavy rains with their resulting floodwaters destroy the nests, dens, and cover of ground-nesting birds such as quail and turkeys and the dens of rabbits, foxes and other species of wildlife that prefer to live on and near the floodplains of streams, creeks, and rivers.

If you find yourself confronted with young wildlife, such as deer, rabbits or foxes that have apparently been abandoned, the best thing you can do (provided it is in no imminent danger and appears to be in good condition) is to leave it alone. Incidentally, you can significantly reduce the "imminent danger" to young wildlife by keeping your pet dogs and cats confined or on a leash during the spring and summer months. Free-ranging dogs and cats harass and often kill nesting birds and pregnant females of all wildlife species. Go back the next day to check on the abandoned animal you have found. Chances are that it will have been moved to a safer location during the night by the parents.

Young birds that have fallen from their nests should be replaced in the nest or, if they are well developed, just placing them in a

ike Godfrey

secure place on a limb near the nest site is often enough to ensure that the parents will continue to care for them.

If you are certain that the animal is abandoned or is in imminent danger, call your local wildlife biologist or wildlife enforcement officer. They will be able to offer suggestions or know how to properly handle the situation.

If you choose to try to rear the immature animal yourself, you are immediately confronted with several problems.

To start with, it is illegal to hold most species of wildlife in North Carolina without a special permit from the N.C. Wildlife Resources Commission. Such permits are issued only under very special circumstances for most protected species. Permits for other species, such as deer, bear, or cougar taken from the wild, cannot be obtained under any circumstances.

Also, young wildlife require special diets, environment, and care, often all but impossible for "foster parents" to duplicate. If you were successful in obtaining a permit to hold the animal, you can refer to the books "Bird Ambulance" by Arline Thomas (1971); "Enjoying Keeping Wild Pets" by Rosemary Collett (1970) or the article "A Bird In The Hand," June 1977 **Wildlife in North Carolina,** for information on diets and proper care for the animal or bird. Keep in mind that your chances of successfully rearing a wild animal are slim at best; and if you are successful in rearing the animal to maturity, it should be released in the wild as soon as it is able to care for itself. Part of the responsibility of rearing a wild animal is to train it to fend for itself. Your ultimate goal should be to return it to the wild as soon as possible.

Few species of wildlife readily adapt to living with people or make good pets; and even these are somehow diminished by the arrangement. Help, if your help is needed, but keep in mind that wildlife's rightful place is in the wild.

Curtis Wooten is a regional wildlife education representative with the Wildlife Resources Commission, and his photos appear regularly in this magazine.

Water, The Gift of Life

by Jim Dean

The old man knelt on the moss and plunged the enameled dipper into the icy water of the spring. Then he handed it to the boy standing behind him.

"You've never had any real water, son," he said. "There's nothing better in the world than cold spring water."

The boy took a long pull, then looked back at his grandfather.

"Yeah, that's good," he said in a voice that was almost reverent. That first taste of spring water made a profound impression on the boy. Often, he and his grandfather would stop at the same spring while hunting in the area, and even years later, he would never drink from a spring without recalling his grandfather's appreciation of pure water.

Water. It is largely taken for granted, but without it there would be no life on this planet. It is, perhaps, our most critical natural resource.

It may also be our most abundant resource, covering all but about 30 percent of the earth's surface. And yet, water — usable water — is relatively scarce. Of the vast quantities of water on earth, over 97 percent is saltwater. Freshwater is created in that huge distillery called our atmosphere, and it comprises less than three percent of the water on the planet.

That seemingly small amount would be far more than enough were it evenly distributed throughout the world. North Carolina, fortunately, is one of the places where freshwater has always been plentiful.

Yet, even here, there have been problems; and there are genuine concerns that water will become an even more critical issue.

Indeed, water has already shown itself to be as volatile as gasoline when disagreements arise over its use. The problem is that almost everyone has a different view of water — or a different use for it.

The fisherman, swimmer or boat-user is fearful that his favorite body of recreational water will be polluted, changed or destroyed. The city official worries about the adequacy of his town's water supply for drinking and growth. The industrialist is concerned about pollution and the resulting restrictions that could put him out of business or at least make his business less profitable. The farmer wants it to rain. The golfer doesn't want it to rain (but certainly the greens must be irrigated). The homeowner frets about his water bill. Some agencies, businesses or individuals want to drain water from lowlands using canals, while others want to cover similar areas with lakes or ponds.

To some degree all these concerns and uses are legitimate, yet many of them are in direct conflict. Also, depending upon your point of view, some uses of water are nonessential, even harmful.

Certainly, it cannot be denied that some of the trends in water use and planning in North Carolina have been influenced by the conflicts which have occurred in years.

Perhaps by looking at a few of these issues, we can gain a rough overview of the problems, as well as our progress or lack of it.

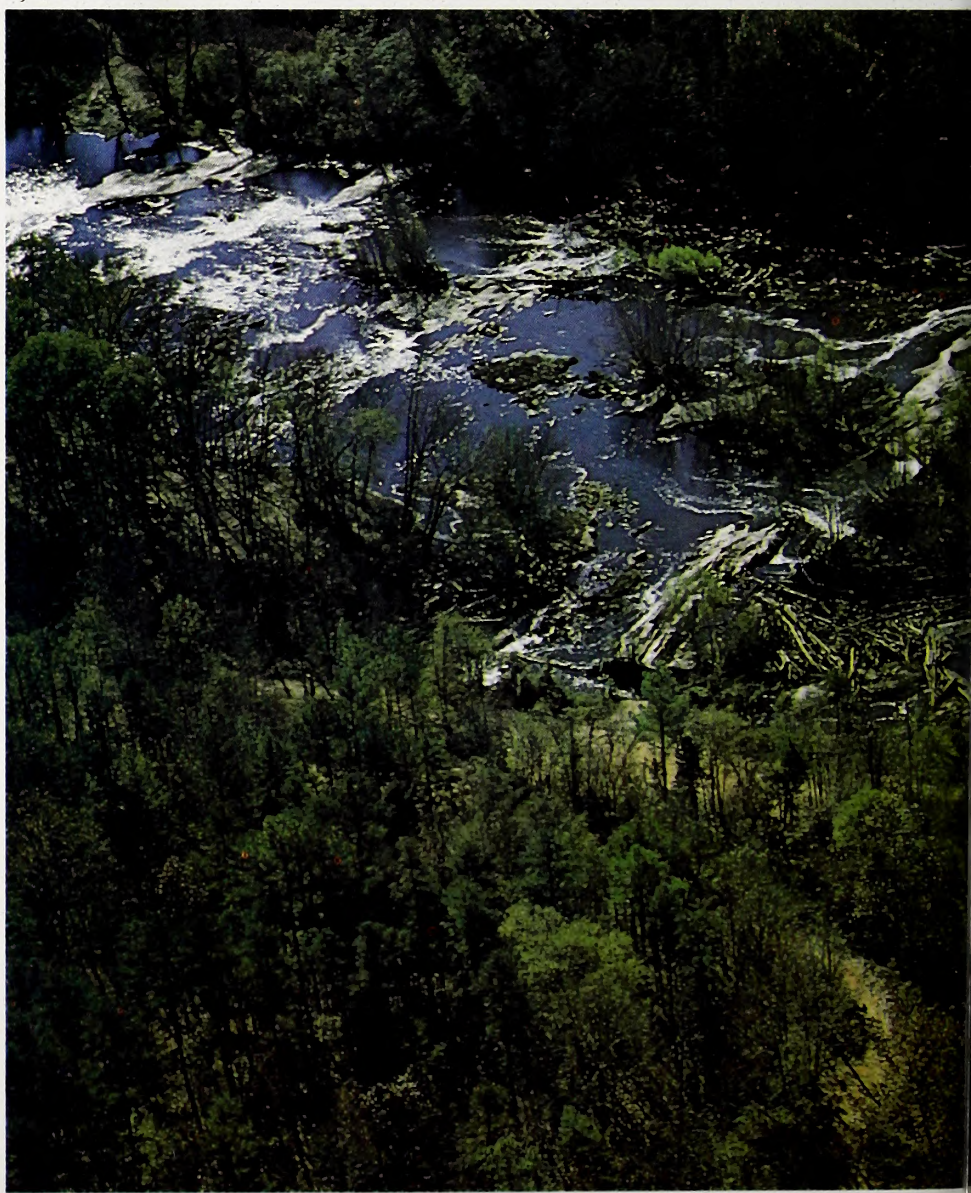
Water pollution has been one of the major problems for many years; yet in some areas, we've made some strides in the past couple of decades.

When I was a child growing up in Roanoke Rapids in northeastern North Carolina, the pollution in the Roanoke River was notorious. Often, during low water in the winter, the river around the town of Weldon would be covered with a dense layer of white foam. The river stank; and fishermen who pursued the spawning rockfish (striped bass) frequently found their lines fouled with a bacterial slime that they mistook for wood pulp. The pollution came from several sources including my hometown's sewage disposal and textile mills. Still the largest and most noxious source of pollution in the Roanoke was probably from the pulp mills in Roanoke Rapids.

In recent years, however, the pulp mills have installed costly pollution control equipment, other pollution has been reduced and the Roanoke is cleaner than it has been in the memory of most who live along its banks.

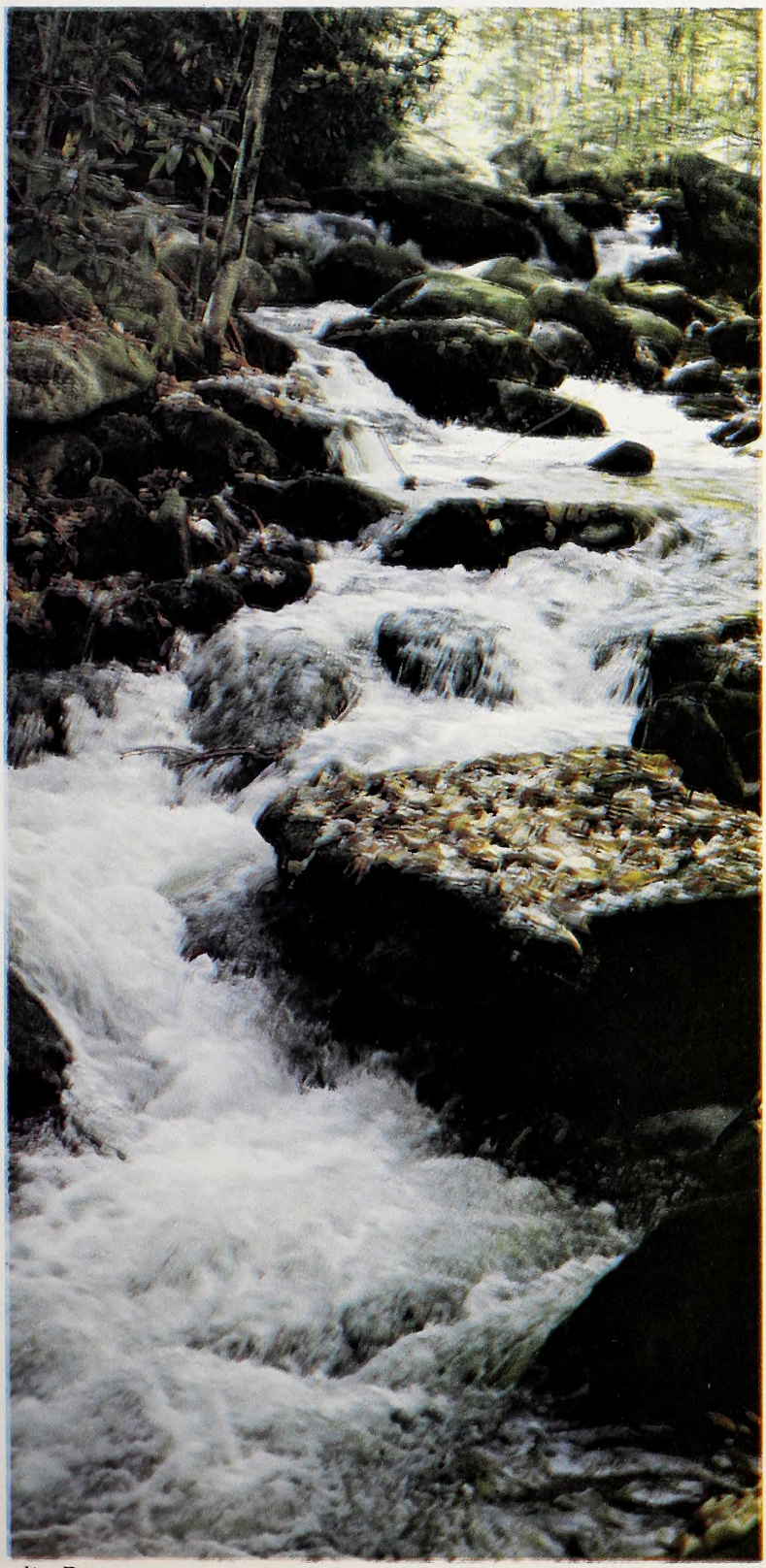
"Of the vast quantities of water on earth, over 97 percent of it is saltwater."

Jim Dean



Duncan Heron

A rainbow is an appropriate symbol for the life-giving water that falls as rain (overleaf), replenishing the cool springs (left) which unite as swift mountain streams (below) and flow east across North Carolina as powerful rivers. Yet, many of our rivers are seriously threatened, as is the Neuse (opposite bottom) shown here at the town of Falls in Wake County. This is the site of a dam which will back up a massive lake all the way past Durham, flooding some of the most valuable wildlife habitat in this part of the State.



Jim Dean

In a general sense, this is typical of what has happened to many rivers across the State over the past 20 years. The adoption of stream sanitation standards along with passage of tougher state and federal laws have resulted in gradual, but significant progress in a clean up of many of our most polluted waterways. They may still be polluted, but it has been worse for many of them.

It has not always been an easy road, and some industries fell by the wayside when they were unable or unwilling to meet water quality deadlines. In western North Carolina, a large pulp mill in Sylva closed down rather than comply with the standards (although there are doubts that these standards alone forced the issue).

Of course, not all of the problems involve industry. Indeed, waste from municipalities and silt from farming and construction are at least as damaging to our streams and rivers. Many towns and cities have constructed new waste disposal facilities with the help of bond issues and federal and state funds, although some disposal facilities are still far from adequate.

Passage of strict State sedimentation laws have helped with the control of the massive — and often overlooked — problem of silt. Just a few short years ago, one of North Carolina's best mountain trout streams — the Thompson River — was virtually destroyed by silt from road construction. Yet, when renovation of a stretch of Rt. 181 between Morganton and Linville was undertaken a couple of years ago, sediment controls were so strict they cost over a quarter of a million dollars. Cooperative efforts between the N.C. Department of Transportation, U.S. Forest Service, N.C. Wildlife Resources Commission and other groups — including Trout Unlimited and the 101st Airborne Division — helped save several quality trout streams which would surely have been otherwise destroyed.

Partly as a result of that landmark operation, sediment controls are now supposed to be a routine part of highway construction — and more important, must be considered in the initial cost benefit studies of any highway project. As you drive over our highways, a closer look may reveal some of these controls in the form of settling basins, silt nets and

reseeding of raw land. Private land development and sand and gravel mining operations must also adhere to sediment regulations, and enforcement is improving.

Of course, there are still major problems. Silt is virtually impossible to avoid when highway construction, land development, or sand and gravel mining occur in the floodplain alongside a stream or in the streambed itself. While the renovation of Rt. 181 stands as an example of how controls should work, there are others — such as the current re-routing of N.C. 19 along Scott Creek — where silt controls have been a dismal failure. Where silt is concerned, we've still got a long way to go.

Channelization, which involves converting a natural stream into a straight, shallow drainage ditch with bare banks, has had an immense impact on many of our streams, especially in the Coastal Plain. Countless streams have undergone channelization carried on by the U.S. Soil Conservation Service and the U.S. Army Corps of Engineers in order to improve drainage and put more land into cultivation. The loss of many eastern swamps and natural waterways through channelization has had disastrous effects on fish and wildlife over the years.

However, there is evidence that if any future drainage projects are undertaken, they may be far less damaging. The recently completed, often bitter, lawsuit over the proposed channelization of Chicod Creek in eastern North Carolina has seen to that. The court's decision has been greeted as a landmark, and will shape the way streams are altered and lowlands drained not only in North Carolina, but throughout the country. Basically, the courts have ruled that channelization as it has been practiced in the past is no longer acceptable. Still, we must be watchful that any projects underway or proposed do not cause problems like those in the past.

Another critical influence on water is the impounding of large lakes. Rare is the watershed in North Carolina that does not have at least a few artificial lakes of varying size, and many others are on the planning books in various stages of development. Some — like the Appalachian Power Company dam on the New River or the 14 small dams in western North Carolina on the French Broad

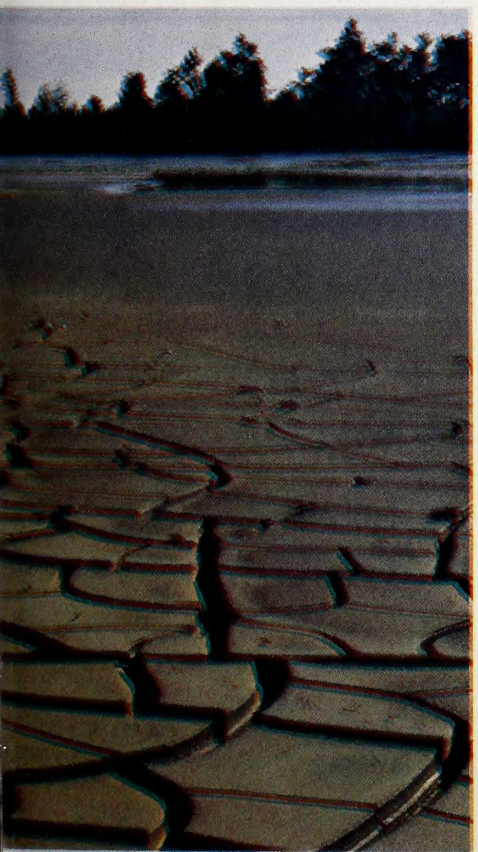
"Citizen's support for massive impoundments is not as favorable as it was a few years ago, and justification for a huge dam (for recreation, water supply, or flood control) is more difficult to obtain."

Duncan Heron

Duncan Heron

The controversial New Hope or B. Everett Jordan Dam in Chatham County (below) is complete, but has not yet been filled pending litigation over water quality in the lake. The area to be flooded is prime wildlife habitat and part of the N.C. Wildlife Resources Commission's Game Land Program. Silt is one of the biggest threats to water quality. This basin (bottom) filled with silt in a mere 11 months. Prior to its construction, all this silt flowed into the Pee Dee River. Heated water from steam electric or nuclear power plants like this one at Brunswick (left) can pose problems for fish.

ncan Heron



Wise Use Of All Our Water Resources Will Be Essential If We Are To Meet Tomorrow's Many Different Needs

To The Last Drop?

by Mark Taylor

Lawns slowly turned yellow, then brown, under the glaring sun. Cracked grey mud flats replaced what had once been sparkling blue lakes. Farmers shook their heads in despair as they pumped the last water out of their irrigation ponds and watched their crops wither away.

Last summer's drought taught many Americans a bitter lesson. Water is a limited resource, and North Carolina was hit almost as hard as many states in the traditionally water-thirsty west. Is there enough water in North Carolina to meet future needs? Where is it abundant, and where is it scarce? What can we do to conserve it? To answer these questions, and some others, WILDLIFE IN NORTH CAROLINA interviewed John Wray, Head of the Water Resources Planning Branch of the State's Division of Environmental Management.

"Water is plentiful in some areas in North Carolina, but is relatively scarce in others," Wray explained. "With the population of the State steadily increasing, we're going to need careful planning to be able to provide enough water for future industrial and domestic needs while still managing to conserve the quality of our environment. When we talk about planning for future water needs, we don't consider just domestic and industrial use. We also have to consider wildlife, recreation, and many other activities associated with water."

The water needs of the Piedmont, the Coastal Plain and the Mountains are all different, because of the nature of the land. Yet, they all have two things in common. Each area has an adequate supply of water to meet future growth needs if that growth is well planned. But in certain respects, all three regions have their water problems.

"Water is very abundant in the Coastal Plain, and a great potential exists there for future development," Wray commented. "Most of the communities in that region rely on groundwater, but in some places, the groundwater levels have fallen very rapidly because of heavy industrial and domestic use."

The most plentiful source of water in the Coastal Plain is the Roanoke River, according to Wray. He also added that the Cape Fear River has a tremendous potential for industrial development along its lower reaches.

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"When we're planning for future development, we should urge industries with extensive water needs to locate in areas where water is plentiful," Wray said. "Where water is scarce, growth should be controlled so that it doesn't outstrip the readily available water supplies."

The Piedmont area was hit most severely by last summer's drought, which is not surprising since it is the most heavily populated region of the State. Once again, problems are usually localized.

"There's a tremendous potential for growth in the Piedmont along the Yadkin and Catawba rivers, and if it's not controlled, there's also a tremendous potential for damage there," said Wray. "In some areas in the Piedmont, water is limited and shortages will continue unless communities are willing to pay exorbitant prices for exotic treatment methods. These areas should not encourage heavy water users to come in, and should be careful to control their growth."

"In the Hillsborough and Triangle areas, water supplies are limited," Wray continued, but if we can get water from the Cape Fear River and if the Falls of the Neuse Reservoir is built, our water needs should be met until the next century."

In the mountains water is plentiful and no real scarcity exists.

"The main problems in the mountains are water quality and flooding," Wray continued. "Rainfall is higher there than in other parts of the State. We do have some spot areas where there are problems with water supplies and waste treatment, because of heavy industrial and domestic development."

Although there is still plenty of water in North Carolina if we're willing to go after it, there is cause for concern. Water use is expected to double by the year 2,000, according to the U.S. Geological Survey. And how much do we really try to conserve water? The common household toilet uses four to six gallons of water every time it is flushed. A shower uses 20 to 30 gallons, and a bath uses 30 to 40 gallons of water. Yet composting toilets, which use no water, are available and very few attempts are being made to build household plumbing systems that conserve, or recycle, water.

And have we had to make any real sacrifices in time of drought? I used to think so until I traveled to a few parts of the world that suffer from real water shortages. Several years ago I worked as a timber marker on a National Forest in central Arizona. Out there a shower cost me 75 cents, the nearest river to my cabin was 80 miles away, and all of the reservoirs were lined with a plastic sheet to keep water from seeping out into the soil. About a year later I visited an area where water was even more scarce. A friend of mine had landed a temporary teaching job on the Island of St. Croix in the U.S. Virgin Islands, and it seemed like an appropriate time to drop in for a visit. The first thing we saw after leaving the airport was a brush fire creeping up a mountainside.

"Why don't they put out the fire?" I asked my friend.

"Because there's no freshwater on the island, other than what they tanker in from the mainland or catch on rooftop cisterns," he explained. "Water is much too valuable to be used on a brush fire; so unless it's threatening someone's home, they just let it burn. There used to be plenty of water here, but by the late 1800's 75 percent of the island was in sugar cane production. They pumped out so much water for irrigation that the saltwater intruded, and now there's no freshwater left under the island. Most of the rest of the Caribbean is the same way."

While North Carolina, and much of the rest of the country, doesn't suffer from a water shortage in the sense that many other areas of the world do, there's still cause for concern. Nature has served notice that the era of unlimited water, like unlimited wildlife, unlimited timber, and unlimited land, has come to an end.

Water, clean water, provides millions of North Carolinians with healthy recreation such as canoeing, fishing, sailing, and swimming. The economic and social values of water-based recreation are tremendous. And yet, because such values are difficult to measure, many people overlook them. Likewise, the value of a salt marsh (overleaf) has often been underestimated, yet it is here that much of the ocean's life is born. Destroy the salt marshes, and you destroy commercial and sport fishing. Without shrimp, oysters, and many other marsh dependent species, a seafood platter would consist largely of hushpuppies and slaw. Obviously, we can ill afford to destroy a resource as priceless as a salt marsh.

Duncan Heron

"Wildlife species like squirrels, deer, raccoons, and others cannot merely move out into the surrounding countryside when their homes are flooded."

Duncan Heron

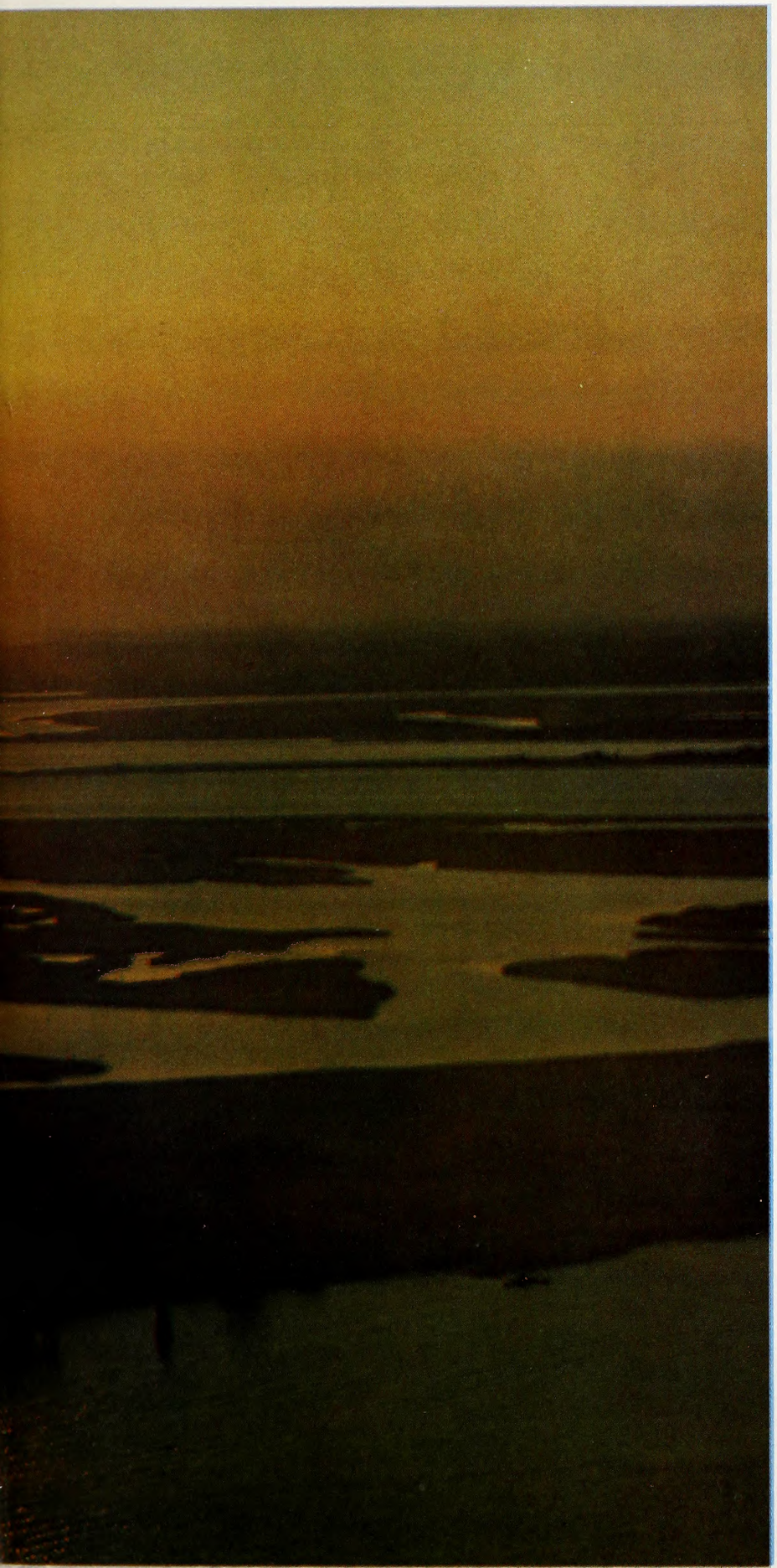
and Mills rivers — will never be built. Citizen opposition killed the New River Dam, as well as the 14 impoundments proposed by the Tennessee Valley Authority.

Others, like the B. Everett Jordan Dam (called New Hope) on the Haw River and the huge Falls of Neuse Dam in northern Wake County, may eventually be a reality. Indeed, Jordan is already completed, but has not been filled, awaiting a final decision in the courts over questionable water quality in the lake. Critics of the Jordan Dam have argued that the water quality in the lake will be unsuitable as a water supply, and that flood control can be achieved by a dry dam that is closed only during rare occurrences when legitimate floods threaten. Also, this would preserve thousands of acres of very valuable wildlife habitat currently designated as game lands.

Many other proposed dams exist in a sort of limbo. They have been opposed successfully by various groups, have no local citizen support, and have not been funded. Yet, these plans stay on the books, ready to be dusted off at any point in the future whenever the climate of acceptance or funding seems more favorable.

Lake construction in North Carolina has declined, and is unlikely to reach former peaks (some would say because the best spots are already dammed). At any rate, citizens' support for massive impoundments is not as favorable as it was a few years ago, and justification for a huge dam (for recreation, water supply, or flood control) is more difficult to obtain. Equally important is the fact that there is an increasing awareness of other "costs" of lake building. Valuable land, often our most fertile, is lost. People are increasingly reluctant to give up their ancestral homes for lakes they suspect are unjustified.

Also, from a fish and wildlife standpoint, huge impoundments can be disastrous. Rivers and streams offer habitat to some fish that cannot live in lakes (not to mention unique recreation like canoeing). Wildlife species like squirrels, deer, raccoons, and others cannot merely move out into the surrounding countryside when their homes are flooded. A forest can support only so many squirrels, and this population usually achieves a natural balance. If squirrels displaced by a lake try to move in, they find there is no room



Duncan Heron

for them. (If, for example, your apartment burns, will your neighbor, his wife and kids let you move in permanently?) Also, there are new laws involving endangered species which have greatly influenced the building of dams, as well as other government funded projects.

Of course, there are other water-related problems in North Carolina, some of them relatively new and a long way from being resolved. Down east, phosphate mining has raised the question of adequate and unpolluted groundwater supplies. In many areas, especially along the coast, the problem of too many septic tanks is creating pollution problems for fish, wildlife and man.

The pollution of estuarine areas carries vast ramifications because this is where much of the ocean's life is spawned. The ripples are widely felt, like a pebble dropped into a pond. Local fishing industries are hurt, tourism suffers, and ultimately we all become involved to some extent. Solutions are far from simple. For example, some argue that a landowner has a reasonable right to do what he wants with his property, but if he destroys an oyster nursery, is he not violating the rights of others who make a living from these shellfish? And if you simply like to eat oysters, are not your interests and rights involved?

Overall, one can look at the water resources in North Carolina and see significant progress in the past two decades, but it is also true that water — and its related problems — will be with us a long time.

Still, there is at least one observation that can be fairly made. There was a time when water management and water projects were undertaken with little input from the public. In most cases, that no longer appears to be true. Virtually everyone is affected, and more and more people and groups are taking an active role in planning, discussing, accepting or rejecting proposed projects.

If we have made no other progress, we can certainly count this new public awareness as a plus. ⬍

Jim Dean is associate editor of **Wildlife in North Carolina**, *and has written many newspaper and magazine articles on water pollution, channelization, fishing and other water-related subjects during the past 15 years.*

by Betty Jennings

A Bachelor's Degree In Angling? It's Available At N.C. State University's Sport Fishing School At Hatteras

Fish School...So Can You!

"Fish on!"

That jubilant cry is repeated many times during the five days of N.C. State University's Short Course in Sport Fishing held at Hatteras, North Carolina, each year.

The 60 or so anglers who pay $315 tuition are a heterogeneous mixture of neophytes, repeaters, hoping to improve on their fishing skills, and old-timers who come again just because of the fun they've had in past years. Similar schools have been tried in other places and have failed. They all lack one seemingly essential ingredient for success — North Carolina's string of pearls — the Outer Banks.

The Fishing School, as it's familiarly called by the students and staff, was founded in 1952. Three men at the University in Raleigh got together to discover a way of helping the charter boat captains of the Outer Banks. Dr. Fred Barkalow of the Zoology Department, one of the original three, explains how it began.

"The captains certainly knew how to put people where the fish were," said Barkalow. "Their problem was that they were supplying only antiquated boat tackle to their clients. Their fishing rods were made of hickory or bamboo, some as big around as a man's wrist, rigged with 12/0 to 14/0 conventional reels and linen or monel metal line."

"The idea was born for the Continuing Education Division to conduct a short course in sport fishing in the area," Barkalow continued. "Next, we contacted several fishing tackle manufacturers and asked each one to send a representative, complete with their latest gear, to Morehead City. One man was assigned to each boat chartered for the course. He demonstrated the proper use of his equipment and left a rod and reel with each captain on the last day."

The second year, a new innovation was introduced by one of the manufacturers' representatives, a spinning reel, imported from France and mounted on a fiberglass rod, complete with monofilament line.

The Banker captains scoffed at this "new-fangled" gadget. "It's like trying to catch fish with a sewing thread," said one of them. However, the captains were soon converted when dolphin were taken with this light rig.

In 1957, the course moved from Morehead City to Nags Head. In 1962, it took up permanent head-

Duane Raver

The Hatteras beach is the "classroom" for this group of fishing school students. The following day, the eager anglers will board these well-equipped fishing cruisers and head for big game in the Gulf Stream (right).

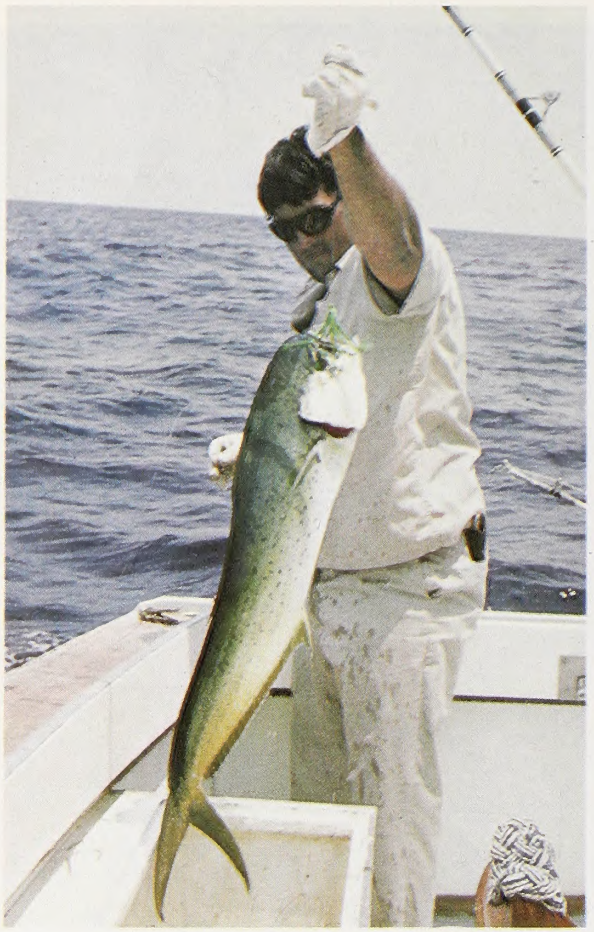
W.W. Hassler

quarters at Hatteras Village. Always self-sustaining, the school has never cost the State of North Carolina a cent.

Since the school is not a money-making project for the University, most of the advertising is by word-of-mouth. Attendance is available to anyone who can pay the tuition and many of the students come as a family group, sharing a vacation. Perhaps only father will be enrolled in school, while his family relaxes and enjoys the beach. Some attend as husband and wife teams. Numerous students deliberately "flunk" the course just so they can repeat it eight or nine times.

Since 1954, Dr. William W. (Bill) Hassler, Department of Zoology, at State, has headed a "faculty" of 13 professors, graduate students, man-

W.W. Hassler



W.W. Hassler

The offshore trips during the school seldom fail to produce good catches. The wide variety of game fish available in the waters off Hatteras improve the chances, and dolphin (right) are often caught in large numbers. Many fish are returned unharmed.

ufacturers' representatives, a professional guide from Buxton, the assistant chief of the Marine Fisheries Division of the Natural Resources and Community Development Department, and the editor of this magazine.

This staff takes great pleasure in sharing with the students their expertise in salt- and fresh-water angling, including spinning, fly and bait casting. The class also gets a taste of such subjects as ichthyology (the study of fishes), oceanography and ecology. Often, some simple instruction from one of these knowledgeable men will make the difference between success and failure as a fisherman.

At the first gathering each year, Dr. Hassler informs his students that the staff will be happy to talk fishing and fish with you 20 hours a day. All they ask is that you allow them the remaining four hours each day to themselves.

The pupils soon find that this is not an exaggeration, especially in the talking department. It is a carefully kept secret among fishermen that fully half the pleasure of fishing is talking about it before and afterwards.

Hatteras is a unique base for fishing in the River of the Sea, better known as the Gulf Stream. The Stream is located some 15 and 20 miles off Hatteras, being closer to shore here than any other place along the East Coast, except Florida.

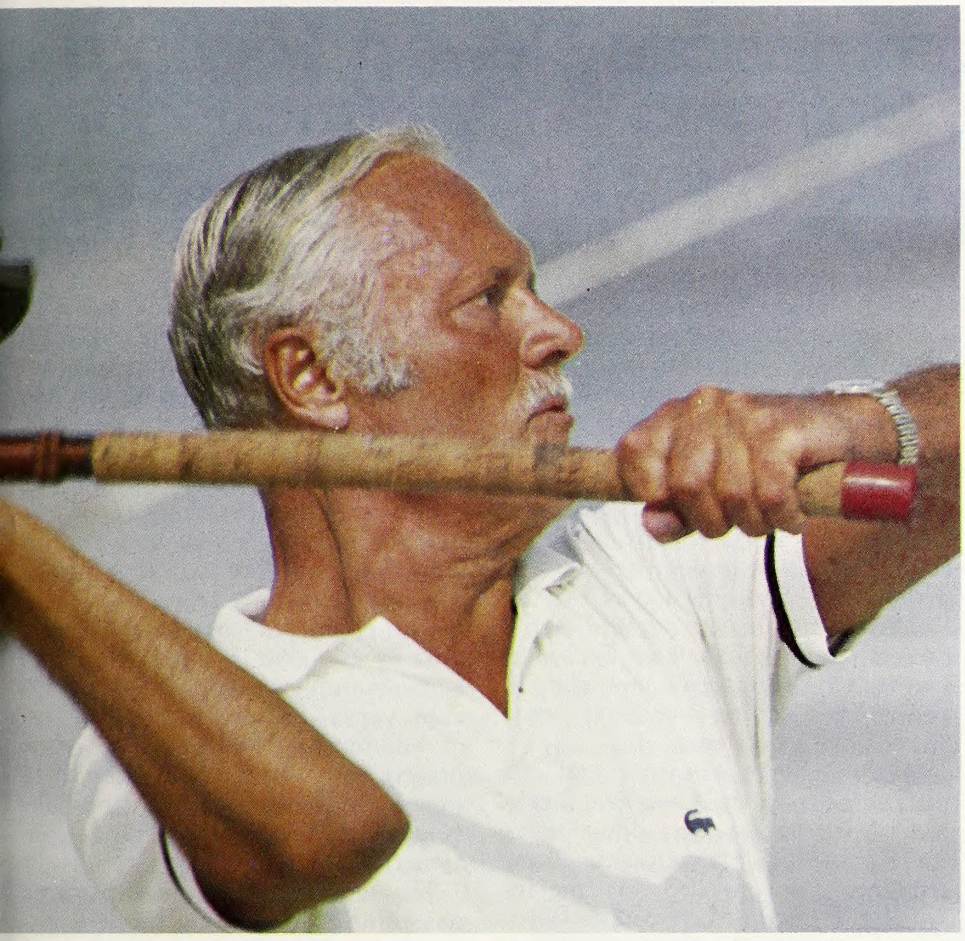
The waters off Cape Hatteras also include the infamous Diamond Shoals where so many ships have foundered. One of those lost here was the Monitor of Civil War fame. The Monitor Research and Recovery Foundation, based at Beaufort, North Carolina, is exploring the possibilities of raising this famous ship. The wreck is our nation's first marine sanctuary which makes it inaccessible to fishermen; however, there are plenty of other wrecks available in the same area and these are fished over extensively with good results.

The Gulf Stream is the Mecca of sport fishing and the home of blue and white marlin, swordfish, and sailfish. Here, too, under the golden brown patches of sargassum weed, lie the multi-colored dolphin. These "billy goats of the sea" supply much of the fun and food for the students. Many days, the school boats return to the docks with several hundred pounds of this delicious fish. Most seafood gourmets agree that dolphin is unsurpassed in flavor when broiled or baked. Other fish found in the sapphire waters are wahoo, bonito, black and yellow fin tuna, amberjack, and the sleek king mackerel.

Every sport fisherman dreams of doing battle with a billfish. If you are lucky enough to be among the select group of 60 to 70 students at the school, the odds are very good that you might "raise" a marlin. On the average, 10 to 12 blue and white marlin are caught each year by the students. Most of these marvelous fighting fish are released by the anglers.

In the peaceful hamlet of Hatteras, the average person lays aside his dependency on such things as telephones, television, and newspapers. If you are adamant about your daily newspapers, you may want to get up early enough each morning to snare one of the few delivered to the local cafes.

Spending five days at Hatteras is like returning in time to a simpler way of life. The school schedule is fairly flexible with one important exception—the 7 a.m. departure of the boats for the two trips to the Gulf Stream.



Most students are casting like experts after a few minutes instruction by the professional tackle men and fishing guides serving as teachers. Surf, sound, offshore and pier fishing are all right here at this famous "game fish junction."

The fishing school is a pleasing phenomenon. It brings together individuals of diverse concerns and occupations — the doctor and the housewife, the lawyer and the farmer, the nurse and the engineer. The one common denominator is a love of fishing.

Most people, headed for Fishing School, come in their cars. There are three routes to choose from: through Morehead City to Hatteras by way of two ferries; from Swanquarter, on the mainland, by ferry to Ocracoke and free ferry to Hatteras; or through Manteo on U.S. Hwy. 64. Just west of Nags Head, you take a sharp right onto Hwy. 12 leading down the Outer Banks to Hatteras.

Registration is held at school headquarters in the Sea Gull Motel from 1:30 to 5:30 on Sunday afternoon the third week in June.

Pupils usually have time to check into their motel rooms, unpack and have dinner before attending orientation in the bright, new, air-conditioned civic center in downtown Hatteras. In other years, classes were held in the old clapboard schoolhouse, but progress has crept relentlessly into this small spot on the map. After the school building was razed, classroom activities took place in the Volunteer Fire Department structure until the center was completed.

The Sunday night session is devoted to getting acquainted with each other and the staff. Dr. Hassler outlines for the students what they can expect during their stay and ends the orientation with a film.

At 8:30 a.m. Monday, classroom lectures and demonstrations begin. After the lunch break, class reconvenes briefly and is followed by an informal lecture and surf-casting practice on the beach. The school supplies a number of surf-casting outfits and the students may check these out at the office whenever they like. However, individuals must furnish their own terminal tackle and bait as these rods are equipped with practice weights only.

On Monday night, class reassembles to meet and talk to some of the Hatteras boat captains. Bill Hassler hands out a seasick remedy and last minute instructions for the first trip to the Gulf Stream.

Tuesday and Thursday are set aside for two full days of offshore fishing with surf, inlet and/or pier fishing sandwiched in between on Wednesday. Occasionally, because of bad weather, there may be a juggling of this routine. Denis Jackson, of State's Continuing Education Division and the school's administrator, makes every effort to see that two days are spent fishing the Gulf Stream.

Included in the present tuition of $315 are the charter of the offshore boats, lunches, personalized notebooks, motel rooms, a delicious fish fry on Wednesday night put on by the Ladies Auxiliary of the Hatteras Volunteer Fire Department, and the final banquet and graduation exercises on Thursday night.

The final gathering is, for most, a time of good-byes. It is surprising how many close friendships have been made in this brief encounter.

As he hands out the diplomas, during his graduation address, Dr. Hassler tells the class that they can now claim a degree of B.A.S.S. (Bachelor of Angling Secrets and Science).

An almost audible sigh of relief goes up from the staff for a job well-done. They have inspired many to a life-long avocation of fishing. As they scatter, the people will carry the message back to Texas and Pennsylvania, Georgia and Ohio, Washington, D.C. and New Jersey, Virginia and New York, Florida and Maryland.

So, all you potential or practiced saltwater anglers, pack up your fishing gear and answer the siren song of the sea. Come to Hatteras. In June. To Fishing School!

For complete information write: Denis Jackson, Division of Continuing Education, Box 5125, N.C.S.U., Raleigh, N.C. 27650.

Betty Jennings is an Atlanta resident who has attended several of the fishing schools. She enjoys writing as well as big game fishing.

The Wildlife Commission's Newest Boating Access Area Is Going To Be A Humdinger

New Ramp At Wrightsville

by Mark Taylor

Boaters seeking access to the intracoastal waterway and the broad waters of the Atlantic off southeastern North Carolina are now in luck; they will have a new boating access area at Wrightsville Beach.

The access area, which is the largest ever built by the N.C. Wildlife Resources Commission's Boating Division, is scheduled for completion by Memorial Day.

"This is a landmark project in several ways," William Jansen, Assistant Chief of the Boating Division commented. "First, it's the largest project we've ever undertaken, and we're doing almost all the work with our own men and equipment. It's also a landmark as far as cooperation goes. We've had five different agencies involved in this project. The new access area will also fill a real need because we've had countless requests to build a public access area in that region, and there are no others nearby."

The project started when the town of Wrightsville Beach acquired three and one-half acres of land adjacent to the drawbridge on U.S. Rt. 74-76, and donated the land to the Wildlife Resources Commission in the fall of 1977 so that the access area could be built. Since then the U.S. Army Corps of Engineers has placed 5,000 cubic yards of fill on the site from dredging operations on the intracoastal waterway. The Department of Transportation has also given the Commission an easement to run a road to the site under the adjacent drawbridge. The Division of Marine Fisheries has also cooperated in the project, and the Cape Fear Technical Institute has donated some labor in return for giving students some "hands-on" experience.

"We've got 11 students and one instructor from the Cape Fear Technical Institute working down there two days a week," Jansen said. "These students are enrolled in the Institute's marine construction program and this work experience is part of their curriculum. It's working out very well for them and us."

The new access area will have three concrete launching ramps, five boarding docks, and two acres of parking. Three of the boarding docks will be 60-feet long, and the remaining two will be 30-feet long.

"People will be able to launch as big a boat as they can trailer to the site," Jansen explained. "We've designed it so that we have a minimum five-foot draft at the end of the ramps at low tide, so depth won't be a problem. Some people have noticed that there are no provisions for picnicking and other recreation at the site. We've planned it that way; all we want our sites to be is a place to launch, park a car, and run a boat from."

The estimated cost of the access area is $35,000 for materials and supplies only. Approximately 18,000 cubic yards of fill and 1,000 linear feet of bulkheading will be used on the project. Anywhere from three to 10 men from the Boating Division have been working at the site since construction started.

"The entire cost of the access area has come from boating funds," Jansen concluded. "There are no federal funds or other state funds involved. When this area is completed, we'll have 130 public boating access areas scattered throughout the State, all of them built with boating funds, and available to the public at no charge."

Mark Taylor is assistant editor of **Wildlife in North Carolina.**

The Wrightsville Beach Access area will offer boaters a link to the Intracoastal waterway and the Atlantic Ocean. The deep draft at the end of the concrete ramps will handle any boat that can

Close Encounters Of A Feline Kind

Two more mountain lion sightings have been reported in western North Carolina, one of them from a wildlife enforcement officer with the N.C. Wildlife Resources Commission.

The first incident was reported by Mr. L.G. Ledford of Gastonia on December 11, and a letter he sent to **Wildlife in North Carolina** describes the incident.

"As a subscriber and reader of **Wildlife in North Carolina** for several years, I want to report an incident which happened to a friend and myself on December 11, 1977.

"The two of us saw a cougar in Gaston County, in an area on the South Carolina border.

"We saw it cross the road approximately 100 feet in front of us, and go into the bush. We stopped to check for prints and to look around. We saw several tracks and the animal appeared again; this time within 25 feet of us. The tracks measured 1¾ inches by 1½ inches. We then returned home and notified our local Wildlife Enforcement Officer, Chester Ragland, of what we had seen."

The second incident involved Wildlife Enforcement Officer D.R. McGalliard, who observed a mountain lion on January 18, 1978, at about 11 a.m. near Terrell, N.C., in Catawba County. His report on the incident ran as follows:

"While patroling on County Road 1896, I observed what at first appeared to be a large boulder near a hedge row on the far side of a wheat field. I stopped my vehicle and viewed the suspicious looking boulder with my binoculars. The boulder was a mountain lion sitting on its hind legs with its back to me; and it paid no attention to me and kept looking intently into the hedge row. The lion spent the next 20 minutes hunting about 100 yards of hedge row before disappearing around the end of it at the edge of the field. During this time I made observations on its length, weight, color and height against background vegetation. After the lion departed, I determined its height by measuring predetermined locations on the background vegetation which was a loblolly pine plantation about 10 years old. I also observed and measured its tracks and paced off the distances."

"The animal was a tawny yellow color and had approximately six rings on the last third of its tail. Its height was approximately 22 inches, and the length from nose to tail was approximately 54 inches. I measured the tracks and found them to be 2½ inches wide and three inches long, with no claw marks visible. At the time I made the observation with my binoculars, the paced-off distance was 103 yards. I'd estimate the weight of the animal at about 50 pounds."

Numerous other mountain lion sightings have been reported in both of these counties in the past several years.

Although this particular mountain lion wasn't photographed in North Carolina, two more sightings of the critters have been reported in Gaston and Catawba counties. (Leonard Lee Rue III)

Wild Turkey Stamps Now Being Sold

Wild turkey stamps are now available from the National Wild Turkey Federation. The stamps sell for $3 each, and all proceeds will be used for education, research, restoration or the lease or purchase of habitat for wild turkeys.

Limited supplies of the 1976 stamps are still available to sportsmen interested in starting a collection, and the new stamps may be ordered singularly or in sheets of 10.

For more information contact the National Wild Turkey Federation, PO Box 467, Edgefield, S.C. 29824.

Saltwater Fishi

Over 2,000 citations were awarded last year in the 1977 Saltwater Fishing Tournament. Two of the catches set new state records, and one tied a state record. The ne state records were set for black ba and tarpon, while the record f spot was tied.

Species	Minimum Qualifying Weight	Largest Fish	Catch Location	Winner	State Record
Amberjack	35 lbs.	88 lbs.	Off Cape Lookout	Charles Hess Felton, Pa.	125 lbs.
Barracuda	20 lbs.	32 lbs.	Off Cape Lookout	Patty Jackson Washington, N.C.	49½ lbs.
Bass, Black Sea	3 lbs.	5 lb.-12 oz.	Off Oregon Inlet	Stephen Furlong Virginia Beach, Va.	5 lb.-12 oz.
Bass, Channel (Red Drum)	40 lbs.	74½ lbs.	Avon Pier	James Coughlin Bethlehem, Pa.	90 lbs.
Bluefish	16 lbs.	20 lb.-4 oz.	Hatteras Point	Michael Harrington Myrtle Beach, S.C.	31 lbs.-12
Cobia	40 lbs.	75 lbs.	Long Beach Pier	Fred Gibson Lenoir, N.C.	97 lbs.
Dolphin	30 lbs.	63 lbs.	SE Cape Hatteras	Barbara Staples Falls Church, Va.	77 lbs.
Drum, Black	20 lbs.	37 lbs.	Off Oregon Inlet	Harvey Criminger Elizabeth City, N.C.	83½ lbs.
Flounder	7 lbs.	19 lb.-3 oz.	Carolina Beach	Dickie Wolfe Carolina Beach, N.C.	20 lbs.
Grouper	20 lbs.	56 lbs.	SE Hatteras Inlet	Anthony Whitehurst Virginia Beach, Va.	245 lbs.
Mackerel, King	30 lbs.	45 lbs.	Off Hatteras Inlet	C.B. McManus Norwood, N.C.	57½ lbs.
		45 lbs.	Bogue Inlet	Michael Cooper Winston-Salem, N.C.	
Mackerel, Spanish	4 lbs.	9 lb.-11 oz.	Emerald Isle Pier	Ray Matthews Ridgeway, Va.	11 lb.-6 oz

February Enforcement Report

For the month of February, 1978, the North Carolina Wildlife Resources Commission checked a total of 6,641 hunters and fishermen and 306 boaters.

Of the hunters and fishermen, 647 were prosecuted and 546 convictions were obtained. The total fines collected tallied $12,043 and the total costs collected were $12,104.

Of the boaters, 55 prosecutions were made and 44 convictions obtained. Total fines collected tallied $55 and total costs collected were $999.

Other prosecutions totaled 43 and convictions totaled 32. Total fines collected tallied $745 and total costs collected tallied $650.

ournament Results

The tournament for 1978 started March 15, and for more information contact the North Carolina Department of Commerce, Travel and Tourism Division, Joel Arrington: Tournament Director, PO Box 25249, Raleigh, NC 27611. The winners for last year are as follows:

Species	Minimum Qualifying Weight	Largest Fish	Catch Location	Winner	State Record
Marlin, Blue	300 lbs.	647 lbs.	Off Oregon Inlet	Keith Bingham Portsmouth, Va.	1,142 lbs.
Marlin, White	50 lbs.	108½ lbs.	Off Hatteras	John Monsell Manasquan, N.J.	118½ lbs.
Sailfish	30 lbs.	75 lbs.	Off Hatteras	George Arnold Kingsport, Tenn.	80 lbs.
Snapper, Red	10 lbs.	34½ lbs.	Off Hatteras	Anthony Whitehurst Virginia Beach, Va.	40 lbs.
Snapper, Silver	4 lbs.	8½ lbs.	Off Hatteras	Chester Pawlowski Virginia Beach, Va.	10 lb.-6 oz.
		8½ lbs.	Off Hatteras	Buddy Sidwell Virginia Beach, Va.	
		8½ lbs.	Off Cape Lookout	Mary Walker Atkinson, N.C.	
Spot	1 lb.	1 lb.-10 oz.	Nags Head	Percy Chavis Newport News, Va.	1 lb.-10 oz.
Tarpon	30 lbs.	159 lbs.	Topsail Beach	Donald Banks Jacksonville, N.C.	159 lbs.
Trout, Grey	5 lbs.	11 lb.-14 oz.	Hatteras	Marvin Mason Richmond, Va.	13 lb.-10 oz.
		11 lb.-14 oz.	Hatteras	Bob Pearson Canton, N.C.	
Trout, Speckled	4 lbs.	9 lb.-14 oz.	Hatteras Point	Wayne Hall Smithfield, Va.	12 lb.-4 oz.
Tuna, Yellowfin	40 lbs.	163 lbs.	Off Hatteras	Joseph Dobbins Duplin, Va.	203 lbs.
Wahoo	35 lbs.	98 lbs.	Off Oregon Inlet	Robert Collins Indian Head, Md.	127 lbs.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

N.C. Guidebook Available In Braille Tapes

Marguerite Schumann's outdoor guidebook to North Carolina, "The Living Land," will soon be available in braille and taped editions.

The book contains a guide to natural areas in North Carolina.

For more information contact the N.C. Library for the Blind and Physically Handicapped, 1314 Dale Street, Raleigh, N.C. 27526 or call 919-733-4379.

In Orange County!

Pony Killings Puzzle Biologists

Two livestock killings, which occurred in Orange County, have State wildlife officials puzzled. The first incident occurred during the evening of March 10 when a pony was killed within 40 yards of its owner's house, located halfway between Hillsborough and Chapel Hill. Three weeks later, on March 31, another pony killing took place nine miles away in Calzander, a small community a few miles west of Chapel Hill.

In the first killing, the pony weighed between 500 and 600 pounds. There were puncture wounds in its neck, and several pounds of meat had been chewed off the animal's rump. In the Calzander killing the pony weighed about 300 pounds, and there were no tracks around its body. The animal had also been dead for several days before it was found, and had been heavily fed upon by animals in the area.

"These killings were probably made by a very large dog or an escaped exotic cat," said Earl Gillis, a biologist for the N.C. Wildlife Resources Commission, who is investigating the incidents. "There is also an outside chance that it was a cougar. The second kill was so badly decomposed by the time we found it that it's hard to tell what happened, but the pattern of feeding on it was the same as it was on the first kill; so there's a very good chance that the two incidents are related. There are several interesting characteristics of the first kill that make it unique."

If the killings were the work of a dog, it would have to have been a very large one, according to Gillis.

"Dogs usually work in packs, and there were very few tracks around; so this seems to have been the work of a single animal," he said. "The kill technique also wasn't characteristic of a dog. Dogs usually attack an animal from the rear and chew on its legs, hamstringing it. The first pony was very large for a single animal to kill, unless the killer itself was exceptionally big."

According to Gillis, both owners claimed their ponies were used to having dogs around, and the pony in Calzander had stood off attacks from wild dogs before.

Gillis feels the killings were more characteristic of a large cat.

"There were puncture wounds in the necks of both animals; and in the first killing, we found spots where large mouthfuls of hair had been torn out of the pony's mane," said Gillis. "Large cats often kill their prey by springing upon its back and biting through its neck."

According to Gillis, tracks found around the first site indicate that the pony had been knocked down twice. An evening rain made it difficult to identify the type of animal that had made the tracks, although the plaster cast of a track that Gillis took from the first site measures over 4½ inches long. There were no claw marks visible in the plaster cast which indicates that it may have been a cat, since a cat's claws are retractable while a dog's claws are not. Due to the poor quality of the track, Gillis still feels it may be a dog.

"I heavily favor the dog theory, because it's much more likely" said Gillis. "Most livestock kills are usually the work of a dog. But if it was a dog, it would have to be one of the very large breeds, and the killings are not characteristic of how a dog usually kills its prey."

According to David Lee, who has been cataloguing cougar reports for the North Carolina Museum of Natural History, chances are the animal wasn't a cougar.

"Most of the cougar reports we've had from that area have been rather shaky, although we have had several reports from that area in the past," said Lee. "It's a heavily developed area, and cougars usually prefer solitude. The kill also wasn't characteristic of a cougar, because it wasn't a clean kill. It is characteristic of a kill that might have been made by an escaped exotic cat. The animal's claws could have been dulled, and it might not have known how to make a clean kill."

The first killing occurred within 40 yards of the owner's home and never woke him up.

"I don't think that these killings were made by a native wild animal," Gillis said. "Currently, we don't know of any wild animals living in this area that could have done this. One problem we've had is we haven't been notified of the killings until several days after they occurred. Whenever a livestock kill occurs, the owner should contact us immediately and not disturb the site until after we've made our investigation."

Wildlife officials are still investigating the incidents.

—*Mark Taylor*

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Nature's Ways

by Sid Baynes
illustrated by Duane Raver

The Many Homes Of Our Feathered Friends

While many types and shapes of nests are used by birds as places where they can lay their eggs, incubate and protect them, all individuals within a particular species of bird can be expected to build a similar nest. Depending on the complexity of the architecture and the urgency of the need, from just a few hours to as much as several weeks may be required for nest construction. In general, most birds build at least one new nest each year using those materials which are easily available. Nest architecture for different species varies from crude, as is the case with many shorebirds, to elaborate structures like that of the Baltimore oriole.

Woodpecker

The nest of the least tern, like those of many other shorebirds, consists of a small and simple hollow scraped in sand, shell, or gravel. It may be sparingly lined with vegetative materials, but most often is left unlined.

The downy woodpecker's nest consists of a tree, stump, fence post, or log cavity which usually contains only a pile of fine woodchips. Most other woodpeckers have similar nests.

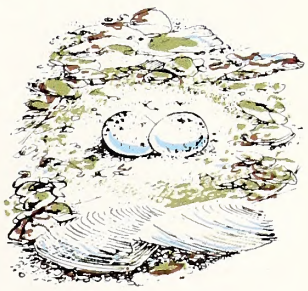
Robin

Great horned owls choose to use the old nests of other large birds and have even been known to use squirrel nests. The usual nest would be constructed of sticks and lined with softer materials.

Grasses, small sticks, string, pieces of cloth, and mud are all combined by the female robin in the construction of her nest. The finished structure contains a deep depression, custom-made to fit the shape of her body.

One of the most elaborate nests is that of the Baltimore oriole. It consists of a beautifully woven deep pouch made of plant fibers, vines, strings, hair, and other soft stringy materials. It is usually attached to a strong, but limber tree branch, often 40 or more feet above the ground.

Baltimore Oriole



Least Tern

Great Horned Owl

Small green spot on my red rose—
Little tree frog sipping cool, sweet dewdrops!

By Barbara Harding

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by Jim Dean
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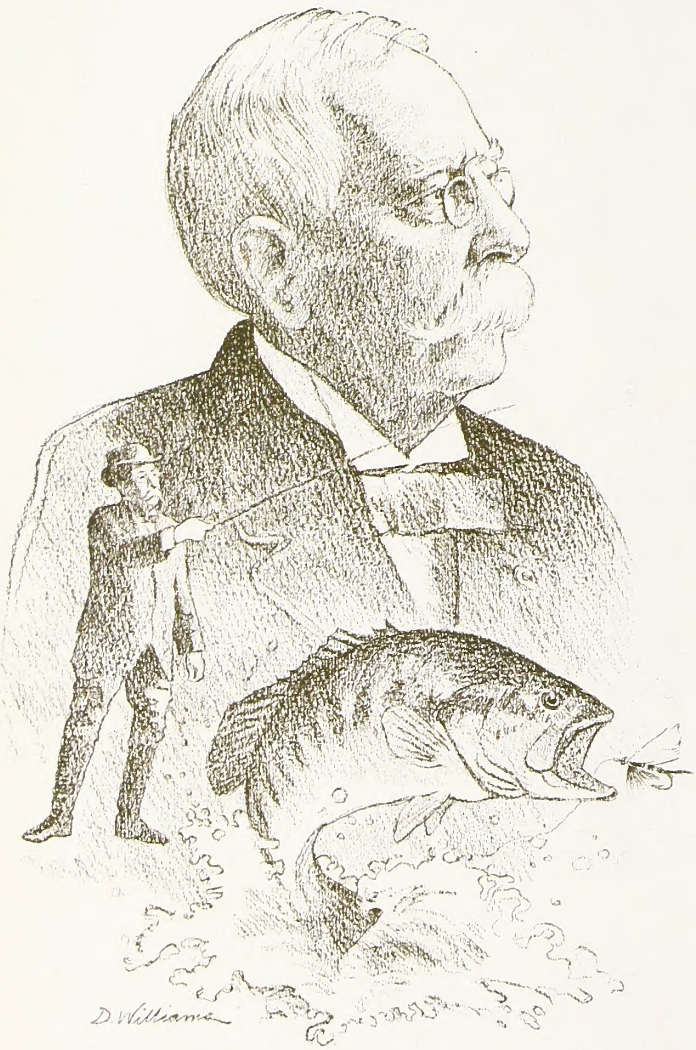
Henshall-A Century Of Bass Fishing



When Dr. James A. Henshall wrote his classic "Book of The Black Bass" in 1881, it quickly established him as the father of bass fishing. Of course, virtually nothing on bass fishing had been written previously, and no bass book published since has had quite the same impact.

It was Henshall who coined the oft-quoted phrase that "inch for inch and pound for pound, (the black bass is) the gamest fish that swims." Henshall also expressed the firm belief that the bass "will eventually become the leading game fish in America."

The irony is that while Henshall was far ahead of his time in his accurate appraisal of the potential popularity of bass fishing, he staunchly refused to accept the notion that methods of fishing might be improved.

For Henshall, it was mostly a matter of honor. He believed that there were only two correct and honorable ways to fish for bass. You used natural bait — minnows, for example — or you used a fly rod and sinking flies or floating bugs, mostly made with deer hair.

So strongly does Henshall state his preference that it would be hard to imagine him trying anything innovative. Yet he was innovative, if only within a narrow framework. He advanced the art of baitfishing and fly-fishing for bass, but refused to try other methods which were gaining popularity.

For example, he detested the new-fangled bass plugs which were beginning to appear on the market. Likewise, he maintained that his specially designed eight-foot bass casting rod was the only acceptable design. Read what he has to say about plug casting in one of the later reprints of his book.

"There are," he writes, "at this present day of culture and refinement, a number of wooden nondescript monstrosities used in fishing, popularly known as 'plugs.' They are usually of elliptical shape, and armed with two to four cheap triangles or triple hooks, and with or without wings or propellers. They may be white, or painted with brillant colors, and spotted, streaked, or striped. They are employed as casting baits, and swim or duck or dive, and wiggle and wabble, on or below the surface of the water.

"It is only fair to say, however, that they catch fish. They are used mostly by those who cast overhead with the short casting stick, called by courtesy a rod, and who consider fishing, not so much as a legitimate sport as a game, in which the fish has no chance whatever, being yanked or derricked out of its element in the shortest possible time."

One simply cannot imagine Henshall sporting a Bass Anglers Sportsman's Society patch while casting crankbaits with a graphite rod from the pedestal seat of a $10,000 bass boat. Of course, hindsight is almost always 20-20, but ignoring the innovation of plug casting seems to have been Henshall's loss, not ours. Maybe he just never got a chance to see a seven-pounder jump on a Zaragossa.

Even so, Henshall would no doubt have been pleased to see the progressive research and management programs which are now underway to ensure that bass fishing will always be good. A roundup of North Carolina's bass program appears in this issue, and many other states have also begun vigorous programs.

Henshall was absolutely right when he foresaw the sporting potential of the black bass, and if he were alive today, he might even admit we've come a long way. Whether he'd purchase a chartreuse spinnerbait is open to conjecture.

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Back Cover *By Ken Taylor*
Life jackets can prevent disaster during a peaceful afternoon of pond fishing.

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Trumpetlike "flowers" of the yellow-green pitcher plant (opposite page) are shaded by a cap which eliminates direct sunlight that captured insects could use as a marker beacon to aid their escape. The glue-tipped leaf of the sundew (left) will eventually envelop and digest the insect. Above is the flower of the bladderwort, a fairly common aquatic species.

Plants That Kill To Eat

written and photographed by Michael Godfrey

THE YELLOW-GREEN *Sarracenia* pitcher stood like an Ionic column above the wire grass on the springtime savannah. Spiralling toward its heady sweetness, a fly lit on the pitcher's lip and sucked hungrily at the nectar secretions. Across the lip a small salticid spider anchored its dragline and pounced. The fly evaded but struck the underside of the plant's cap and fell into the pitcher. It struggled to fly in the narrowing shaft, but the cap blocked direct sunlight from above, confusing the escape route. With each movement the fly was forced downward by the hairs lining the shaft into zones of greater constriction until its wings beat uselessly against the sides of the pitcher. Exhausted, it slipped into the sarcophagous liquor at the bottom to be slowly digested.

Within fifty yards of where I knelt to watch that dramatic example of plant carnivory, I found representatives of every flesh-eating plant genus in eastern North America — the venus flytrap, the sundews, the bladderworts, the butterwort, and the pitcher plants. The place is the Great Green Swamp in the southeastern corner of North Carolina, where these rare and fascinating plants all occur in profusion.

Venus flytrap is favorite. Any poll on the topic would show the venus flytrap as the popular champion plant insect-eater. The traplike jaws of its specialized leaves make spectacular captures of insects and human imaginations alike. Darwin and his sons spent years studying the venus flytrap and dubbed it "the most wonderful plant in the world." Darwin found that the traps are equipped with tiny hair triggers that activate the lobes to close if stimulated *twice;* they do not close on raindrops or random falling objects.

We tend to think of the venus flytrap as an exotic plant, perhaps from some tropical jungle draped in lianas and pythons. Actually it is the most homespun of any of the swamp's insectivorous plants, growing only within a one-hundred mile radius of Wilmington, North Carolina. By virtue of its restricted range alone the plant would be classified as rare, and it is by no means abundant within its bounds. Imagine the thrill, then, of standing on a savannah in the Green Swamp surrounded by half-acre colonies of the venus flytrap. You can almost hear the snap of their jaws!

The tall, yellow-green pitcher plant which opened our story is *Sarracenia flava,* one of four *Sarracenia* species found in the swamp. The physician-botanist Mellichamp applied the first scientific scrutiny to the pitcher plant, discovering that meat decomposes rapidly in the

Insects at the entrance of the hooded pitcher plant are attracted toward the little windows at the back of the shaft. They will tire flying at these lights and fall to the bottom to be dissolved. The best-known carnivorous plant is the Venus flytrap (above and right) whose modified leaves close in a fraction of a second to trap insects.

digestive fluid, that the fluid contains an "anesthetic" which prevents the escape of insects, and that there is a baited pathway of nectar leading to the plant's mouth.

Plants which capture insects are sometimes called "active" if they make some movement in capturing, or "passive" if they do not. Besides the venus flytrap, there are two other "active" plant carnivores in the Green Swamp, though their capturing movements are often too slow to see. The best known are those of the genus *Drosera*, the sundews.

Here, again, Darwin emerges as the primary investigator, and his work still stands as authoritative. He found that the tentacles on the modified leaves contain glands which secrete sticky substances to ensnare small insects. More strikingly, he discovered that when an insect becomes stuck, the leaf gradually forms a cup around the prey bringing more of its surface into contact with the victim to speed digestion. Days later when the chemical exchange no longer pleases the sundew, it resumes its convex presentation to passing insects.

Probably the swamp's least likely carnivore is the butterwort, *Pinguicula caerulea*. Its visible parts consist of a two to three-inch rosette of flattened leaves which nestle in the mats of sphagnum moss in the damper parts of the savannahs. The butterwort concentrates on very small insects such as gnats and midges by ensnaring them with the adhesive secretions on the hairs of its greasy-looking leaves. Stimulated by the struggling, the leaf edges roll inward and envelop the captive. Digestion is accomplished by a chemical exchange involving osmotic pressures. When the leaf reopens, the victim may appear to be alive, but it is dead, having been relieved of certain minerals.

Two of the loveliest aquatic species of *Utricularias* occur in the sloughs and ditches of the Green Swamp. They are called bladderworts because the capturing mechanisms, to the naked eye, resemble tiny bladders. Under magnification the bladders are seen to be complex and ingenious structures for luring, capturing, and digesting prey. Each bladder, or utricle, is equipped with a trap door topped with tentacles which wave to attract victims. When the tentacles make contact, the bladder expands creating a partial vacuum, the trap door opens, and a small volume of water rushes in to equalize the pressure, carrying the tiny aquatic animals with it.

Paradoxes in evolutionary theory. You cannot visit this almost unearthly community of plants in their marvelous habitat without facing the obvious questions they pose. Why do carnivorous plants exist, and why do they congregate in the Green Swamp? By placing themselves above animals on the food chain they reverse the accepted pattern of life hierarchies which has long underpinned the biological sciences. Darwin studied the plant carnivores as paradoxes in his evolutionary theory which he could not ignore, and others have expanded on his work.

Enough has been found to suggest that the plants engage in carnivory to compensate for mineral deficiencies in the soil. Indeed, the savannah soils where the plants exist tend to be poor in certain compounds of nitrogen and phosphorus. In such soils the carnivorous plants are at an adaptive advantage over plants which must obtain all their minerals from the soil. Where the

soils contain the needed minerals, carnivory carries no advantage, and the flesh-eaters are usually excluded. But whatever the intricate balance of factors amenable to the carnivorous plants, these conditions reach a sublime, if poorly understood, formula in the Green Swamp. There the flesh-eating plants thrive in a riotous concert you will see nowhere else.

Even so, these remarkable plants are easily overlooked even by those who live and work near them. Once, while my wife and I were photographing the venus flytrap in bloom, two local woodsmen stopped to speak with us. We were not the first visitors they had seen slowly walking the savannahs with heads down and hands full of field guides and cameras, and they wondered what the "curiosity" was. It turned out they were familiar with the venus flytrap, but they were amazed to learn of the swamp's other plant insect-eaters.

"Well, I'll be darned," one of them said as he looked at a tiny sundew plant. A smile creased his weathered face — that special smile that means a person has discovered something new about life. ◆

Michael Godfrey is a natural history writer and photographer. Godfrey lives in Chapel Hill, N.C. and is a frequent contributor to WILDLIFE IN NORTH CAROLINA. This article was reviewed for accuracy by Lytton Musselman, Educational Director of the N.C. Botanical Garden.

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A small boat is versatile and inexpensive. Here's how to make sure it's also safe.

Who Needs A Yacht?

by Mark Taylor

If I were to reminisce about my first boat in a traditionally nostalgic vein, it would probably run something like this.

"The day seemed to last forever. After an eternity, the magic hour finally rolled around and suddenly Dad wheeled into the driveway. On top of his '62 Chevy was the most beautiful boat in the world. As we untied it and lowered it to the lawn, I caught the fine, clean fragrance of freshly cut wood . . ."

What I remember better is cold, drizzly Saturdays in April.

"Is it dry enough to paint the boat yet," I would ask for the umpteenth time that day.

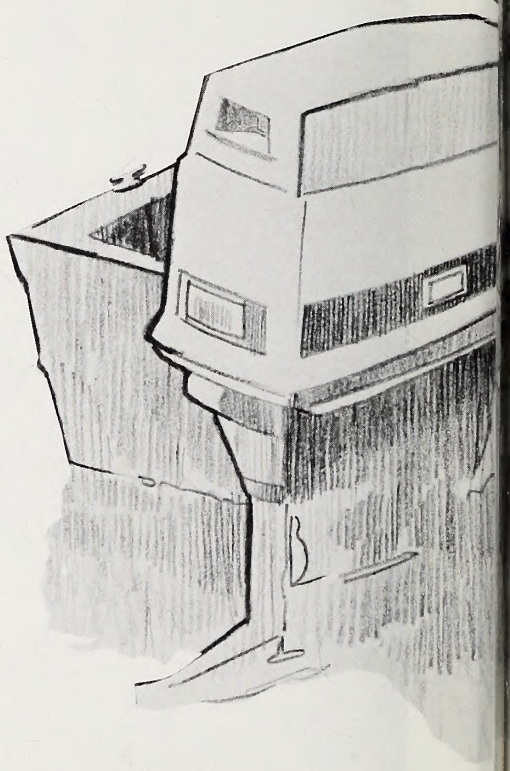
"No," my father would reply, "Wait till the sun comes out and gives it a chance to dry."

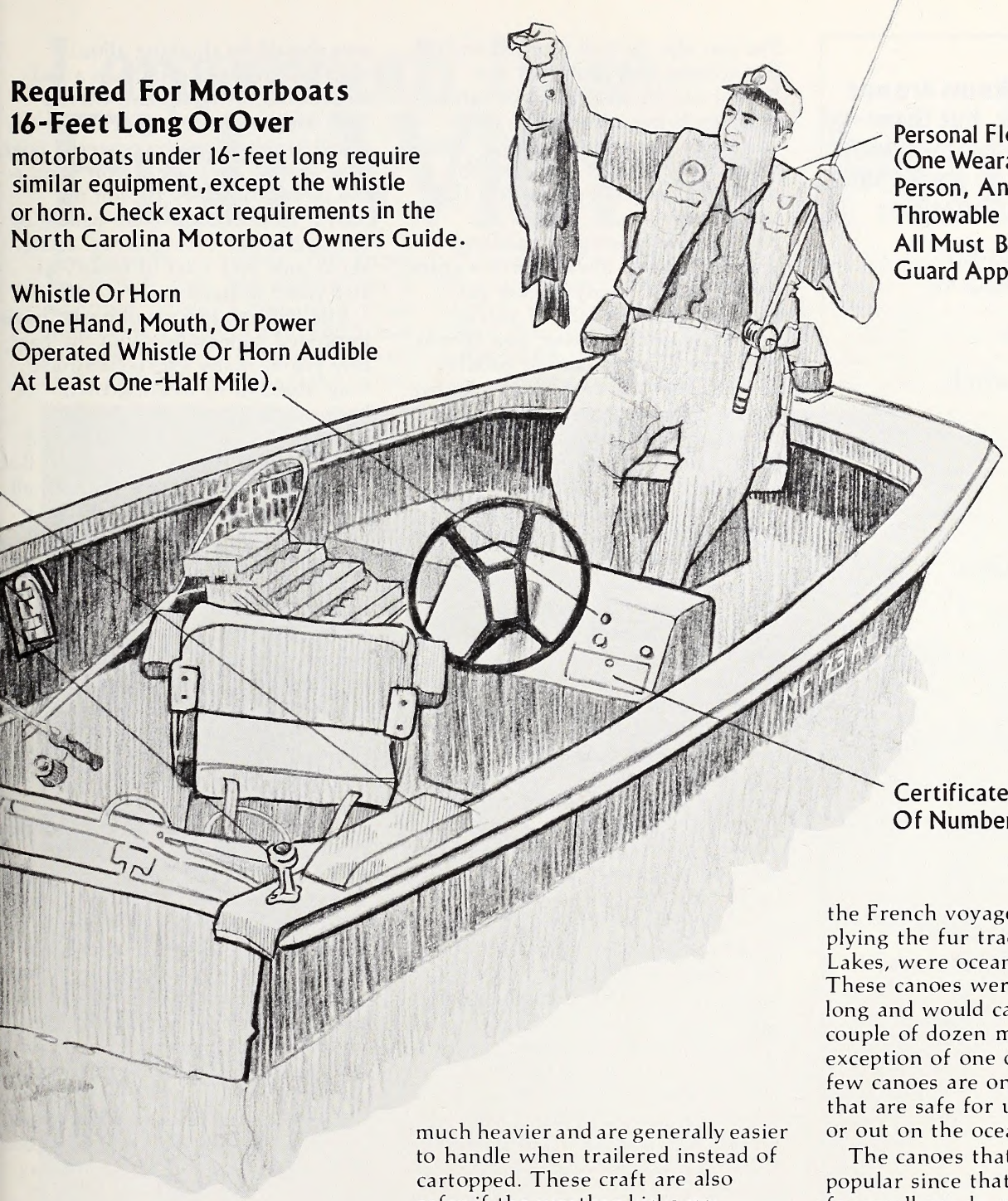
By the time the boat received its annual three coats of paint, it would usually be about the first of July. At the time, I envied the rich kids who buzzed offshore in their big powerboats and caught mackerel by the ashcan full. I was restricted to the sheltered waters of the Maine cove where I spent much of my youth. In time, I learned where to catch the mackerel that came in and stormed over the sand flats like packs of sea-going wolves. I also found that pollock fishing was best right behind a lobster boat (if the lobsterman didn't run you off first), and that the big flounder would usually lie up in the twisting channels that laced through the extensive salt marshes. At 15, I was a ferocious fisherman; and if I had owned a powerboat of my very own, the sky would have been the limit, or so I thought at the time.

My thinking has now come full circle. I no longer envy anyone's big powerboat because now it is I who would be footing the big gas bills and the big boat payments. And in the last 10 years or so, many small boats have been introduced that are light, portable and maintenance free. For the all-round sportsman, there's a whole boatload of boats around that suit his purposes for a multitude of sports.

One of the most versatile watercraft is the jon boat. These square-ended, flat-bottomed boats usually run from eight to 14-feet long, weigh under 100 pounds, and generally cost under $200. They make a perfect mini-bass boat for protected waters and can be used for floating rivers with gentle rapids.

A jon boat can be converted into a bass boat by the simple addition of a few features that can be bought at any hardware store. If you add a couple of swivel seats which clamp onto your regular seats, you're in business. And with a jon boat at least 12 feet long, there's plenty of room for two fishermen, all of their gear, and any electronic gismos you'd care to add. If you slap on a little camouflage paint, you've also got a perfect duckboat for the fall. Also, they're perfect for floating rivers while plugging a bunch of bushytails from neighboring trees because





they're light to carry and can safely be guided through gentle fast water.

The chief limitation of jon boats is their seaworthiness — or lack of it. Their low draft and wide, shallow bottom make them ideal for protected waters, but they are not designed to be used in any kind of heavy chop. They're mainly a river and small pond boat.

Next up the line is the Vee or semi-Vee bottomed boat. These have many of the advantages of the jon boat, but offer considerably more freeboard. Consequently, they're much heavier and are generally easier to handle when trailered instead of cartopped. These craft are also safer if the weather kicks up; however, if you're going to be running rivers gunning squirrels or want a boat that you can nose into a marsh and use for a portable duckblind, you're far better off with a jon boat.

Canoes and kayaks constitute a third category of popular watercraft.

Initially, canoes were built for uses are limited.

Initially, canoes were built for two different types of water: open ocean or lakes, and rivers or streams. The canoes that the Indians used on the ocean, and that the French voyagers used while plying the fur trade on the Great Lakes, were ocean-going vessels. These canoes were up to 36 feet long and would carry a crew of a couple of dozen men. With the exception of one or two companies, few canoes are on the market now that are safe for use on a large lake or out on the ocean.

The canoes that have become popular since that time are meant for small ponds, rivers, and streams. While canoes can carry more weight than most boats of a similar size, they also have their drawbacks. They're tippy. While fishing, you have to be careful when you move around in an average canoe, although the sportsmen's type canoes are more stable than the standard models because they have a broader beam. For fishing on an open lake, a larger standard Vee-bottom boat is a better choice; but for poking around in marshes and running rivers, there are few boats that can compare with a canoe.

The following items are not required by law, but they are strongly recommended in order to assure you of safe and convenient boating:

Portable AM Radio For Weather Reports

Spare propeller

Ignition Kill Switch

Tool Kit

Extra Fuel

Boat Fenders

Foul Weather Gear

Drinking Water

Anchor

Compass

Sponge Or Rags To Wipe Spills

Spare Battery

Flashlight

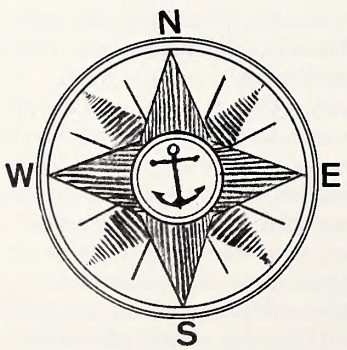
First Aid Kit

Emergency Signal Kit (if on large body of water)

Extra Line

Bilge Pump

Paddle Or Oars



It is also important to always have an anchor on board with an ample supply of line. If your boat breaks down and the sea starts kicking up, an anchor will hold the bow into the wind and waves. The line can also be tied to a sea anchor if you're in deep water. A sea anchor can be purchased or can be made by tying a bucket to a line and throwing it over the side. The drag on the bucket will keep the boat's bow headed safely into the wind.

If you are rowing or paddling, you should also always have a spare oar or paddle handy in case you lose one over the side. If you're operating under power, you should also have a set of oars or paddles in the boat in case a breakdown occurs. It's also a good idea to have a first aid kit on hand along with a few tools.

There's one final item that should go aboard any boat, large or small, whenever it goes out on the water. You won't find it in a hardware store or marina, because it's not for sale. It's called good judgment, and it only comes with experience. Know your boat's limitations. Know where it can be used safely; and if the water is too rough, don't go out.

I learned this lesson well in my first boat up on the Maine coast when I was about 12. At the time, I felt — as most kids do — that I was good in a boat and could lick any sea that came up. This malady is caused by an overdose of Jack London, Charles Nordoff Hall, and other salty reading fare. As the waves started kicking up, I wondered what ol' Jack would have done in my spot.

My dilemma was solved quickly as a big lobster boat bore down on me and "heaved to" a few feet away. At the wheel was a salty old lobsterman. I idolized lobstermen like other kids did professional baseball players.

"Young feller," he said. "I came over here to bawl you out. You got no business being out at sea today in a small boat like that. A good seaman doesn't go out when it's too rough. It's a fight you can't win. Now get yourself into shore."

I got into shore.

Kayaks, blackwater riverboats, pirogues, and sneak boats all have similar characteristics. These are specialized craft made for a special type of water. In that situation, they can't be beat, but they were never meant for use outside of sheltered waters.

When using any kind of boat, you should be thinking about safety. If you get caught in a bad situation in a small boat, there's very little room for error. In any small gasoline engine powered boat, you should always have on hand a life jacket for every person on board, an anchor, a spare paddle or oar, and a fire extinguisher. Spare shear pins and a set of tools will also come in handy.

Life jackets, like small boats, have improved tremendously in the past few years. Many sportsmen have long objected to wearing them because they are bulky, hinder movement, and are hot. With the old life jackets, they were right. But the newer models have changed all that. Many of them fit like a vest and don't hinder movement at all. There are also approved life jackets available that are similar to regular jackets but have fillings that will act as flotation. And for the duck hunter, life vests and jackets are now available in camouflage colors.

Flotation cushions are handy to have in a boat and they're comfortable to sit on, but they aren't meant to take the place of life jackets. Many sportsmen are on the water at times of the year when the water is very cold. If a boat capsizes, hypothermia sets in rapidly, and you quickly lose the ability to hang onto anything. Often, you will lose consciousness quickly. In this case, you want something that will support you even if you pass out. Life vests or flotation jackets provide such support and also add considerable insulation against the cold.

Fire extinguishers aren't required on many small boats, but it's a good idea to have one on board anyway. Station it in an accessible place in case of fire and check it regularly. On any boat that has a permanent fixed fuel tank or enclosed areas where fumes could gather, fire extinguishers are required by law.

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA. The Division of Boating provided information on small boat safety.

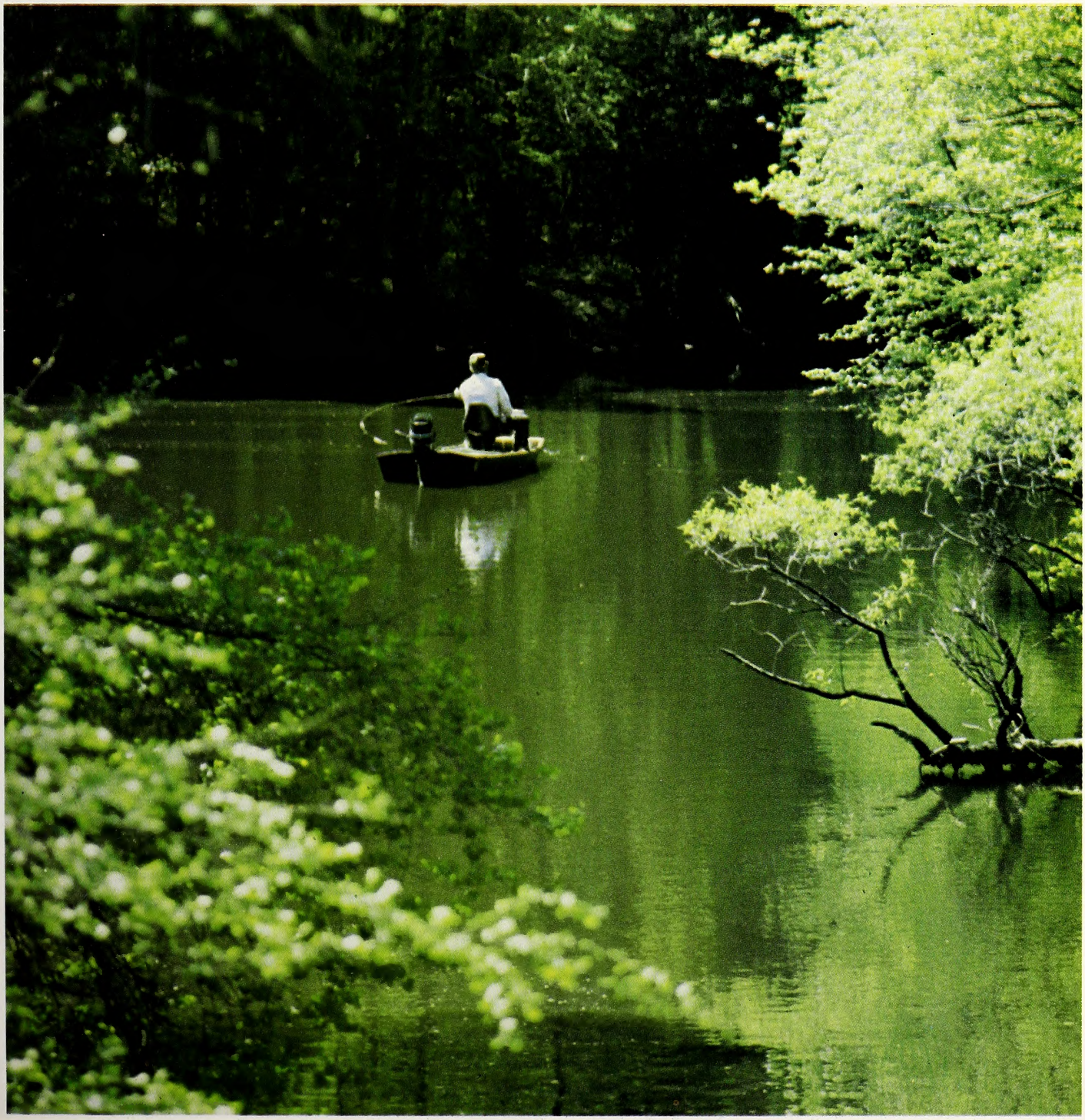
Largemouth Bass - Fish With A Future

by Jim Dean

Somehow or other, the largemouth bass has always had a poor image. Compare a trout and a bass. It's Cary Grant and Junior Samples. Some people think of bass as the rednecks of the aquatic world.

I have a friend who used to work for a newspaper in the thick of northeastern trout country. "Nobody fished for bass," he said. "You'd rather catch leprosy. Shucks, when I was writing a fishing column for the newspaper, I'd capitalize every fish species but bass. Listen, I thought bass were strictly 'lower case' fish."

Those of us who have fished for bass since we were kids know better, of course.



Ken Taylor

"Some people think of bass as the redne

The largemouth bass is a first-rate sport fish. I hope I do not offend too many readers by expressing the opinion that bass are more difficult to catch consistently than trout — even the notoriously picky wild brown trout in Pennsylvania's limestone streams or the wild rainbows of Henry's Fork, Idaho. Unless someone has spent a lot of time fishing for both species, that may be hard to understand. But the gist of it is that the trout fisherman is rarely skunked. He almost always catches at least a few fish even under the most trying conditions. The bass fisherman is more frequently skunked, even under the best conditions.

It is no secret that the popularity of bass fishing has soared in recent years. Yet most fishermen still do not know a great deal about the many bass research and management programs which are currently underway, including those which are being conducted right here in North Carolina.

"We're spending a greatly increased part of our time and money on warmwater fish management and research in recent years, and this is especially true of bass," said Don Baker, chief of the Division of Inland Fisheries for the N.C. Wildlife Resources Commission.

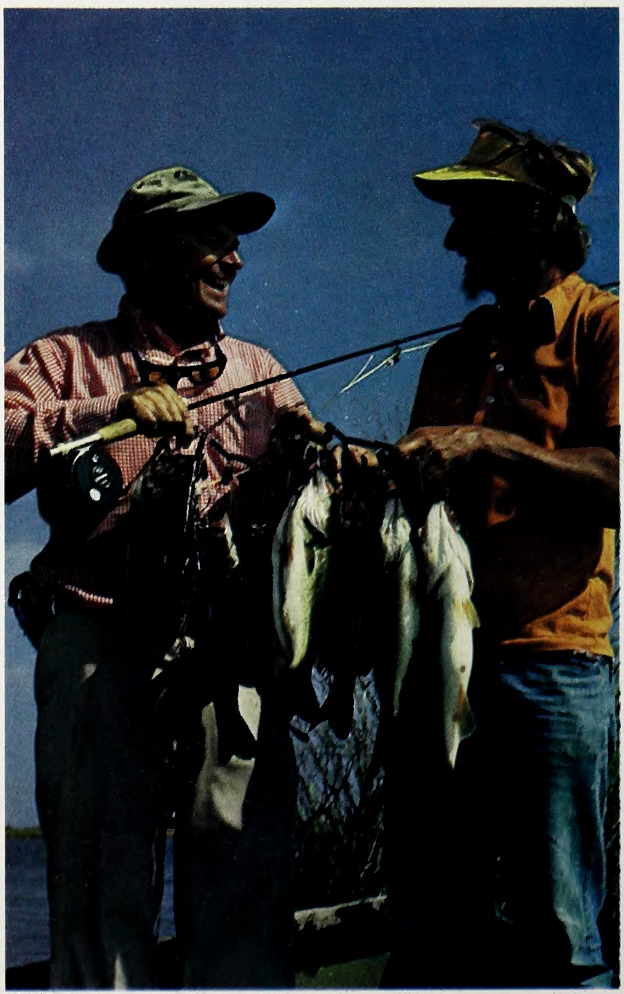
Currently there are projects underway or recently completed which may have long-range implications for bass fishing. For example, we now have experimental trophy bass limits on selected lakes. Among the projects underway are studies of the life histories of bass in coastal streams, catch surveys, studies of bass in brackish water, studies of bass diseases including red-sore disease, studies of food chains in western lakes, farm pond assistance, smallmouth and spotted bass research and habitat studies in problem areas to name a few.

Of these, only the implementation of a trophy size limit for bass has attracted widespread attention.

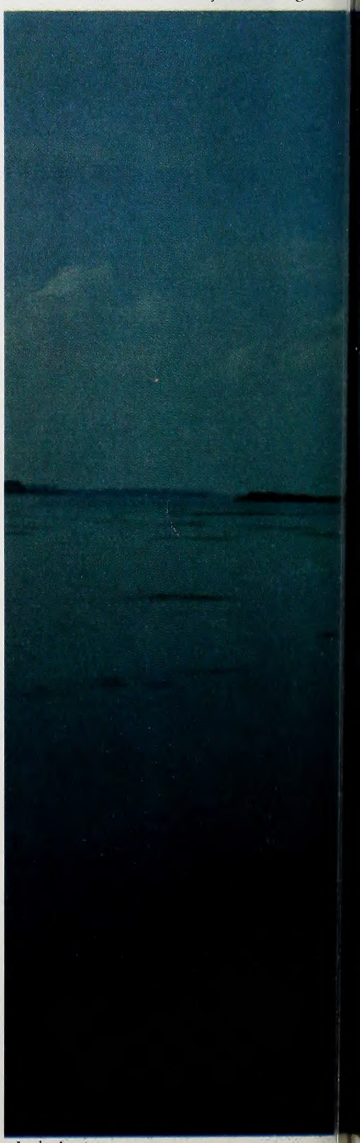
"The idea is to see if increased size limits might have the effect of increasing the average size and numbers of bass thereby allowing an overfished bass population to re-

Joel Arrington

Fly fishing for bass is good at Currituck Sound at times. The angler (below and right) is well-known fly caster and author, Lefty Kreh. First-time fishermen at Currituck should seek the services of a guide.



Joel Arrington



Joel Arrington

ks of the aquatic world,....

cover, and perhaps increase productivity by leaving more mature fish to spawn," said Baker.

Beginning with the 1978 season, the minimum size limit for bass was set at 18 inches on four lakes in the Piedmont. The lakes are Cane Creek Lake in Union County, Lake Higgins in Guilford County, Lake Thom-A-Lex in Davidson County and Lake Tillery in Montgomery and Stanly counties.

"Originally, we had planned to use Tuckertown Lake instead of Tillery, but while fishermen supported the trophy size limit at public hearings, they didn't want to see it applied to Tuckertown," said Baker. "We restudied the idea, and agreed that the trophy limit would get a better test at a heavily fished lake like Tillery than at Tuckertown which is virtually undeveloped."

The trophy regulations will remain in effect on these lakes for four years, during which time careful checks will be conducted to see what the results are. Even if the 18-inch minimum size limit proves to be a success, it won't be applied except where it's needed.

Lots of other states are watching this experiment carefully to see if trophy bass limits can improve fishing. North Carolina is one of the first states to try such an experiment.

However, lots of states have experimented with Florida bass. Several years ago, fishermen were awed by the monstrous bass that were being caught in several small lakes in California. These bass were Florida-strain largemouth bass, and almost instantly, there was a great hue and cry to stock these fish in North Carolina's waters.

Almost every state in the Union came under intense pressure," said Baker, "but we knew that there were potential problems. Some states went ahead and stocked the Florida bass, and they ran a significant risk. We knew that if we weren't careful, we might introduce a disease that could hurt our native bass. More importantly, though, we had heard that the growth rates of those Florida bass might have been mostly dependent

...but bass are more difficult to catch co

on the huge populations of stocked trout that were in those California lakes. Finally, we were afraid that the Florida bass might be harder to catch and that they might tend to replace our native bass.

"We got some Florida bass in 1974 and have kept them at our hatchery in Fayetteville to study them," said Baker. "Right now, I'd say the Florida bass does not seem to be a likely candidate for stocking in our public waters anytime soon. The growth rates of our native bass are as good or better. We're getting ready to study the comparative 'catchability' of the Florida-strain bass now, and we also hope to learn whether these fish tend to dominate and replace native species."

As is evident from this, not all experiments yield results that can be applied, but knowing what not to do is often as important as anything else. During the time that the Division of Inland Fisheries first began studying Florida largemouths, a new strain of bass (called the Snow bass after Jack Snow, a biologist who developed these fish in Marion, Alabama) was also tested. The idea was to find a bass that could be raised to brood stock size on feed in hatcheries. Commission biologists have decided, however, that North Carolina didn't need such a fish because superior natural brood stock is always available here in abundance.

In 1975, North Carolina's fisheries' biologists began a statewide catch survey with the cooperation of bass clubs and individual bass fishermen. Former Commission Biologist Larry Birchfield organized the original survey, enlisting the aid of clubs. The idea was, and still is, to get information that will indicate the quality of largemouth bass fishing and the annual fluctuations in angling success for many of our public waters. From this information, biologists can learn which areas are declining, improving or holding steady.

"It gives us some reliable information upon which to base management practices," explains Don Tobaben of the Wildlife Commission's Division of Inland Fisheries. "Of course, in this survey, we're dependent upon the cooperation of bass fishermen, and we've been very pleased with the help we're getting. Cooperation has been very good, and the list of participants is still growing."

In 1977, a two-year study was completed on the life cycle of bass in brackish and blackwater streams in the Coastal Plains. A summary of the results will be available to fishermen sometime early this winter.

The Pasquotank, Chowan and lower Tar rivers were picked for the

Jim Dean

Big Game Tag Report Number 2

. . . a summary of North Carolina's big game harvest for 1978 as reported by hunters to Wildlife Cooperator Agents

Why should a hunter go out of his way to tag and report the turkey gobbler he just shot? How many deer were harvested in 1978 here in North Carolina? Was the total deer harvest for 1978 greater or less than this figure for 1977? How is this information used? These are questions that often surface during discussions of North Carolina's big game tagging system. The big game tagging system is a reporting procedure which requires that all wild turkey, boar, bear and deer which are harvested by hunters here in the State be tagged at the site of harvest and that certain information be reported to any one of approximately 1,500 Wildlife Cooperator Agents for later collection by the Wildlife Resources Commission. This procedure became mandatory in the fall of 1976.

Successful game management is based on many factors and individual pieces of information, including in this case, big game harvest figures. The more a game manager knows about population trends and numbers, the easier it is for him to make decisions affecting seasons, bag limits and other regulatory matters. Sound big game management must be the result of the combined efforts of sportsmen and the staff of the Wildlife Commission. While the figures in this report represent the reported harvest and may vary from the actual harvest, they are the best such figures available at this time. Please do your share to see that future reports of this nature are as complete as possible by tagging and reporting your big game harvests and by encouraging your fellow sportsmen to do the same.

If you have questions about the tagging procedures or this report, please contact the Division of Game, North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, North Carolina 27611.

White-tailed Deer Harvest

COUNTY	MALE	FEMALE	UNKNOWN	TOTAL
Alamance	60	2	3	65
Alleghany	367	20		387
Alexander	11	1		12
Anson	117			117
Ashe	184	6		190
Avery	30	2		32
Beaufort	797		6	803
Bertie	793	345	3	1,141
Bladen	1,094	56	2	1,152
Brunswick	611	9	3	623
Buncombe	89	50		139
Burke	311	17		328
Cabarrus	1			1
Caldwell	165	4		169
Camden	92	46	1	139
Carteret	163	196	1	360
Caswell	310	4	1	315
Catawba				N/A
Chatham	42			42
Cherokee	4			4
Chowan	175	118		293
Clay	36	5		41
Cleveland	18			18
Columbus	711	237	6	954
Craven	747	185	6	938
Cumberland	425	10	1	436

COUNTY	MALE	FEMALE	UNKNOWN	TOTAL
Currituck	115	15		130
Dare	74	1		75
Davidson	189	74	3	266
Davie	33			33
Duplin	245		1	246
Durham	130	5		135
Edgecombe	570	342	2	914
Forsyth	12			12
Franklin	252	3	4	259
Gaston				N/A
Gates	830	609	1	1,440
Graham	8			8
Granville	303	13	1	317
Greene	6			6
Guilford	12			12
Halifax	287	793	7	2,087
Harnett	10			10
Haywood	128	13	1	142
Henderson	79	3		82
Hertford	357	143		500
Hoke	31	2		33
Hyde	724	445	1	1,170
Iredell	49	2		51
Jackson	1			1
Johnston	80			80

COUNTY	MALE	FEMALE	UNKNOWN	TOTAL
Jones	443		4	447
Lee	N/A			N/A
Lenoir	44			44
Lincoln				N/A
McDowell	101	5		106
Macon	67	3		70
Madison	24	1		25
Martin	493	11	2	506
Mecklenburg				N/A
Mitchell	7			7
Montgomery	645	311	3	959
Moore	78			78
Nash	281	182	1	464
New Hanover	61			61
Northampton	1,135	686	5	1,826
Onslow	710	178	9	897
Orange	131	1		132
Pamlico	418	2	2	422
Pasquotank	75	39	1	115
Pender	1,154	1	14	1,169
Perquimans	153	87	2	242
Person	187	1	1	189
Pitt	246		1	247
Polk	28		1	29
Randolph	105	2		107
Richmond	310	3	1	314
Robeson	92			92
Rockingham	75	2		77
Rowan	185	87		272
Rutherford	53			53
Sampson	348	4	1	353
Scotland	171	3		174
Stanly	149	38		187
Stokes	45			45
Surry	129	3		132
Swain	5			5
Transylvania	97	8	1	106
Tyrrell	90	3		93
Union				N/A
Vance	123			123
Wake	61			61
Warren	561	217	4	782
Washington	129	30		159
Watauga	6			6
Wayne	14	First season 1977-78		14
Wilkes	262	16		278
Wilson				N/A
Yadkin	45	1		46
Yancey	109	21		130
No County Listed	321	78	20	419
	22,844	**5,800**	**127**	**28,771**

Wild Boar Harvest

COUNTY	MALE	FE-MALE	UN-KNOWN	TOTAL
Cherokee	3	1	0	4
Graham	5	2	0	7
Macon	1	0	0	1
Rutherford	0	2	0	2
Swain	4	1	0	5
	13	**6**	**0**	**19**

Wild Turkey Harvest*

COUNTY	TOTAL
Alamance	6
Anson	1
Bertie	5
Burke	1
Caswell	51
Chatham	12
Cherokee	2
Guilford	2
Johnston	5
Martin	5
Mitchell	1
Montgomery	3
Moore	1
Northampton	1
Onslow	21
Orange	3
Person	16
Polk	1
Randolph	1
Richmond	3
Rutherford	1
Transylvania	1
Wake	1
	144

**Only male turkeys were harvested during the 1977 spring season.*

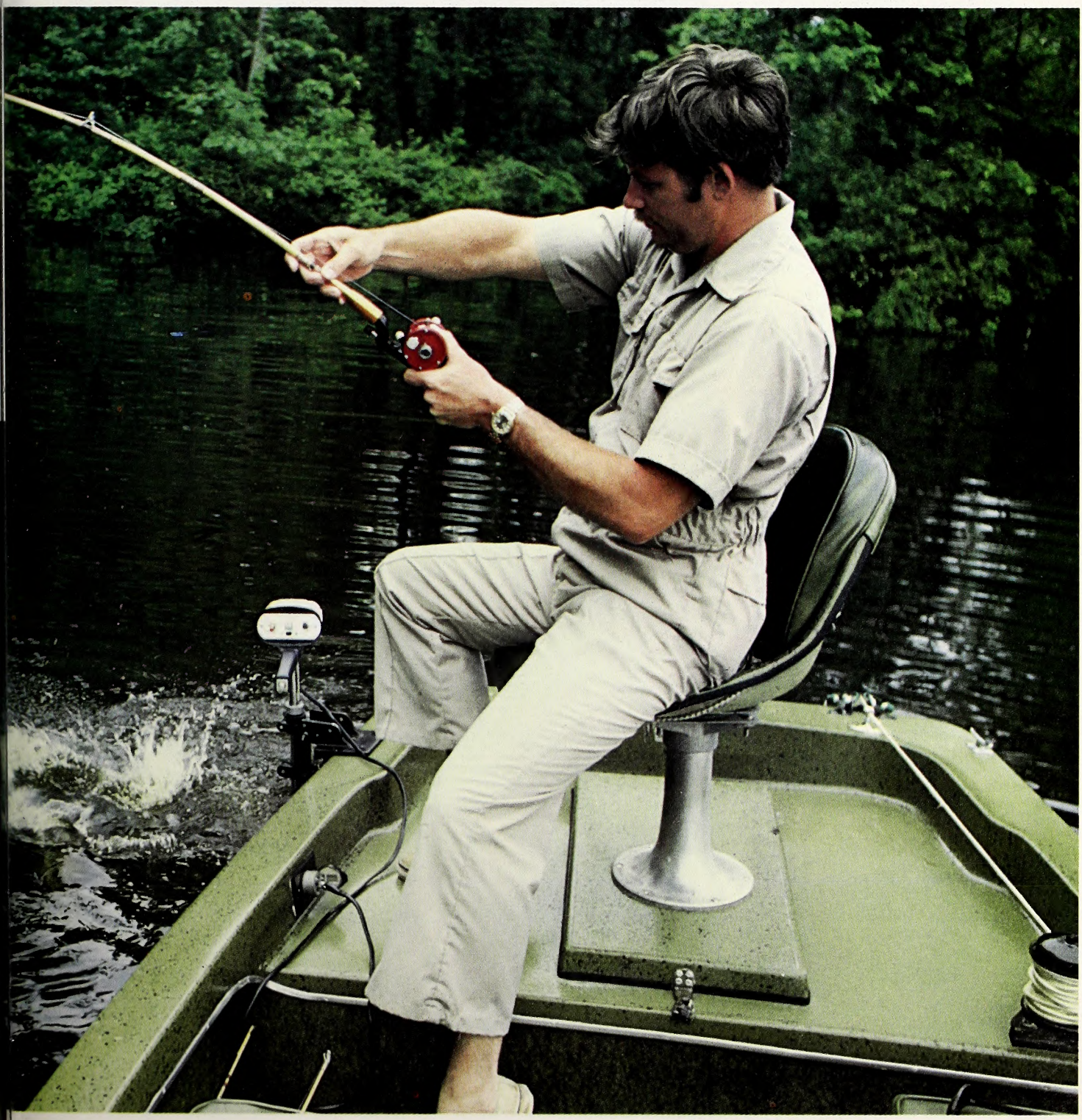
Black Bear Harvest

COUNTY	MALE	FE-MALE	UN-KNOWN	TOTAL
Avery	1	2	0	3
Bladen	3	5	1	9
Brunswick	3	0	0	3
Buncombe	1	4	0	5
Burke	3	0	0	3
Caldwell	2	0	0	2
Carteret	2	3	0	5
Cherokee	1	1	0	2
Clay	2	6	0	8
Columbus	2	2	0	4
Craven	1	0	0	1
Duplin	0	2	0	2
Graham	4	3	0	7
Halifax	1	0	1	2
Haywood	6	6	0	12
Hertford	1	0	0	1
Hyde	0	1	0	1
Jackson	3	0	0	3
Jones	7	7	0	14
McDowell	6	5	1	12
Macon	2	3	0	5
Madison	6	5	0	11
New Hanover	0	1	0	1
Onslow	4	1	0	5
Pamlico	7	6	0	13
Pender	8	9	0	17
Pitt	1	0	0	1
Swain	1	0	0	1
Transylvania	1	1	0	2
Yancey	3	0	0	3
Totals	**82**	**73**	**3**	**158**

sistently than trout."

study, and fish were collected from a variety of areas using mostly electrofishing but also netting. Growth rates were compared with bass populations elsewhere, and food preferences were studied. Generally speaking, the growth rate in these coastal rivers is comparatively slow, although there appears to be no widespread problem of declining populations.

A similar study has been conducted on the Cape Fear River where fishermen had reported bass catches declining. "We had no real information on bass in the Cape Fear," said Tobaben, "so we made an extensive survey and the report should be ready this winter. Basically, we found that growth rates were slow, but populations seemed to be good. We



"...a trophy size limit for bass has attra

don't know what the populations were before we conducted this test, but now that we have some basic information, we can make comparisons from here on out. We did find that those sections of the river which had been dredged had fewer bass than sections which had been left in a natural state."

One of the most important projects underway now is to determine the potential problem areas across the State. Biologists are concentrating particularly on the large western lakes where bass fishing has traditionally been rather poor. The idea is to learn what the probable causes are for this poor bass fishing, and try to learn what — if anything — can be done about it.

There are lots of possible reasons why a lake like Nantahala, for example, doesn't produce consistently good bass fishing. It may be a lack of richness or a weak link in the food chain. It could be that the relationship between predators (bass, walleyes, etc.) and prey (the food they eat) is unbalanced. Biologists hope to learn the problem so that they can correct it if possible.

One problem that has faced fisheries biologists is finding a consistently reliable way to sample bass populations (and those of other species). Fred Harris, a Commission biologist, is currently conducting a study of Lake Higgins which will help make more accurate decisions on bass management based on collections of fish using electrofishing gear. Once this has been accomplished, it will be used extensively especially on small lakes of 1,000 acres or less. This will eliminate much guesswork in future bass management.

The Wildlife Commission is also studying spotted bass and smallmouth bass. An experimental stocking of spotted bass will be made in the Upper and Little rivers in Harnett County, and also possibly in the upper Cape Fear River. Biological surveys show that this water may be suitable, and spotted bass would fill a niche in the predator species that is not already occupied. Spotted bass reach a maximum weight of about five pounds, so this could prove interesting if it works. Spotted bass may also be stocked in favorable waters in the western part of the State if studies prove such a move is feasible.

A similar study is also underway in the northwest part of the State to see if there are streams that might profit from the introduction of smallmouth bass.

Two cooperative studies with universities are underway. Dr. Mel Huish at N.C. State University is using students to conduct a survey of bass in Currituck Sound to see how the fish have fared since the influx of Eurasian watermilfoil. The Wildlife Commission already has data on the Currituck bass population before milfoil arrived, so this information will give a good comparison.

Also, Dr. Gerald W. Eshe, associate professor of biology at Wake Forest University, is studying fish diseases which affect bass as well as other species with special emphasis on the red sore disease that has cropped up in recent years. Samples are being taken in Lake Norman and Albemarle Sound. Red sore disease is thought to be aggravated by pollution, but the organism that causes this disease is found in most waters. What biologists aren't sure about is why the disease crops up in some bodies of water and not others.

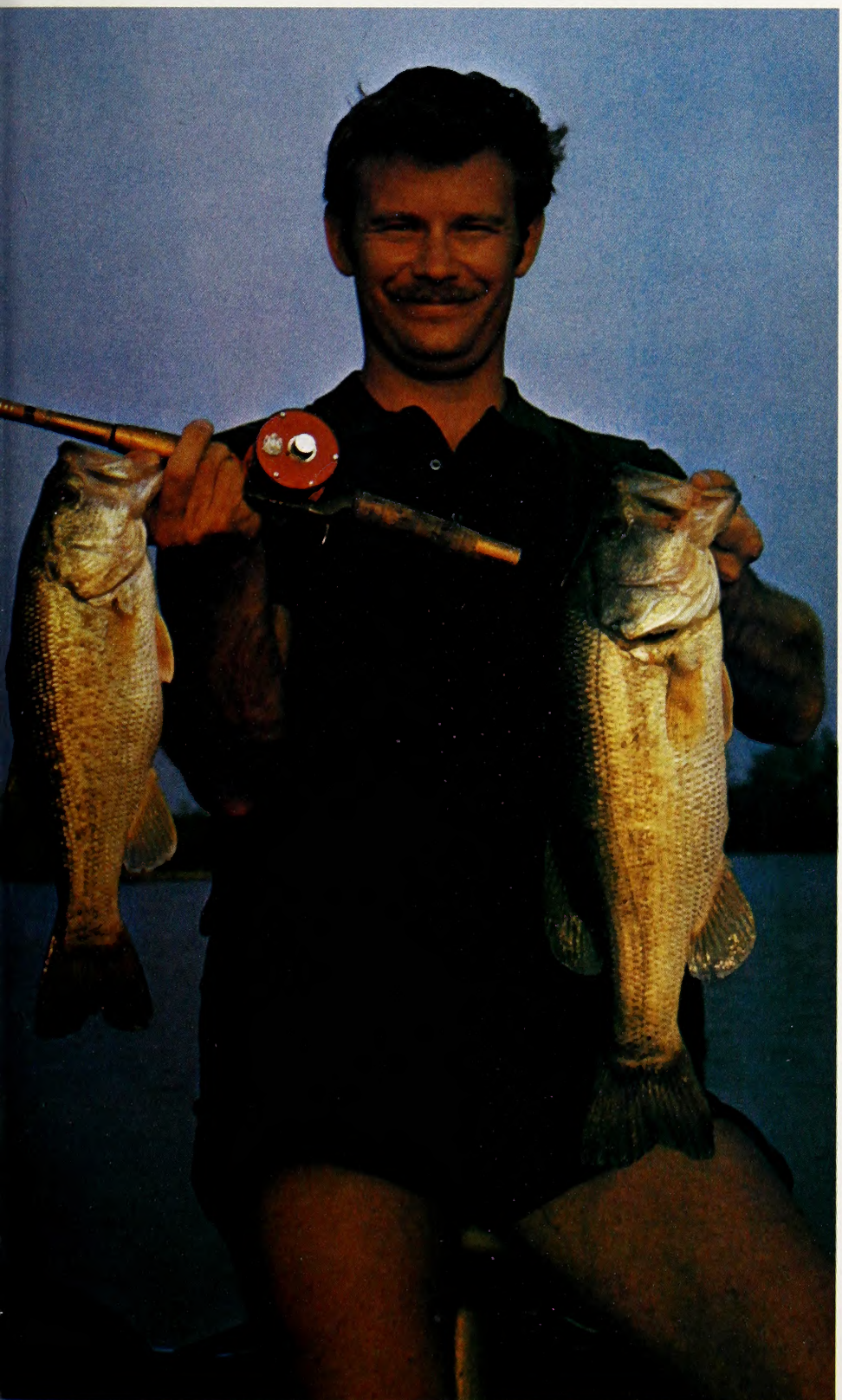
"There are other programs operated by the Wildlife Commission which affect bass fishing," said Tobaben. "For example, we offer technical advice to farm pond owners on a regular basis, and our biologists check about 300 ponds a year. We

Mike Gaddis has every right to be happy with this fine brace of bass (right). Note that the anglers in both photos are using casting tackle. Casting rods and reels have experienced a revival in popularity during the past decade or so because they permit better control and take a wider range of lines than spinning tackle.

Jim Dea

cted widespread attention."

don't provide fish for stocking, but we have the expertise to advise pond owners on what they need to do to improve fishing. The U.S. Soil Conservation Service will provide fish for farm pond stocking free under certain conditions. Those who want to learn more about this should contact their local Soil Conservation Agent."



Jim Dean

Fish research and management is a complex business, and it requires highly scientific, reliable information. Many fishermen simply do not understand the mechanics. If fishing is poor, many people believe that the solution is simply to stock fish — bass in particular.

"It's not that simple," explained Baker. "Stocking is effective only when you have a body of water that is either devoid of bass, or where reproduction is unnaturally low for various reasons. Unlike mountain trout — which we stock in some streams — bass reproduction is usually not the problem. We stock trout in streams where reproduction is poor or nonexistent, and try to manage those other streams where trout can reproduce so that brood trout are returned to the water by fishermen. To simply stock catchable size bass in most bodies of water would be a waste of the sportsman's license dollar, and that's why we don't routinely stock unless we have a scientific basis for doing so."

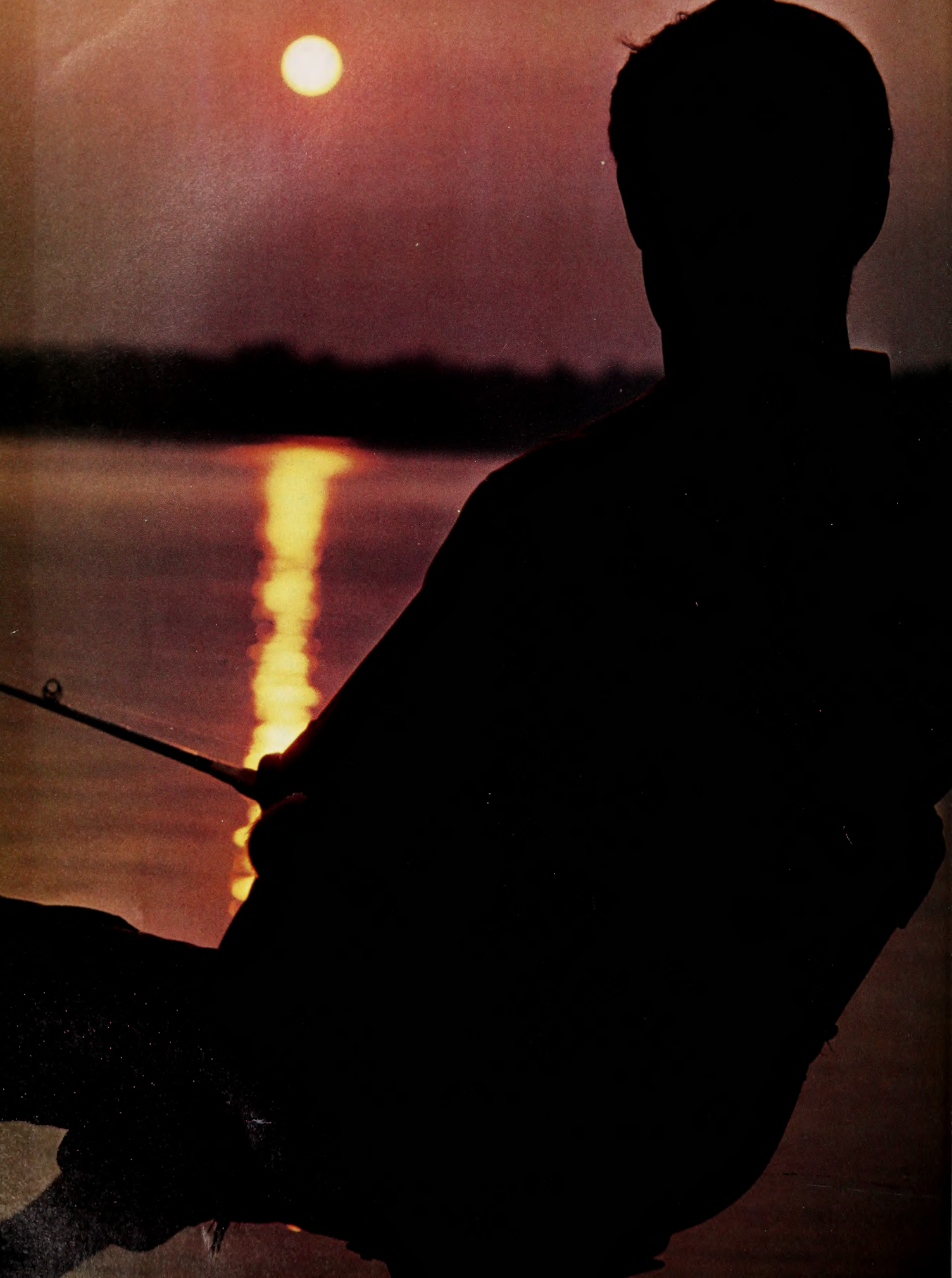
One thing is sure. The management of largemouth bass (and other warmwater species) is coming into its own, spurred by the rapidly growing interest in these fish.

Experts generally express confidence that bass management programs will continue to grow, and the results could well be better bass fishing across the State. The current state record largemouth — 14 pounds, 15 ounces — came from public water (Santeetlah Lake), and public water should continue to provide good fishing.

The largemouth bass has arrived, and it's about time. The late Dr. James A. Henshall was right when he predicted that bass would become a highly popular game fish, even if his prediction took nearly a century to bear fruit.

The bass is the sport fish of the future. And the future is now. ◆

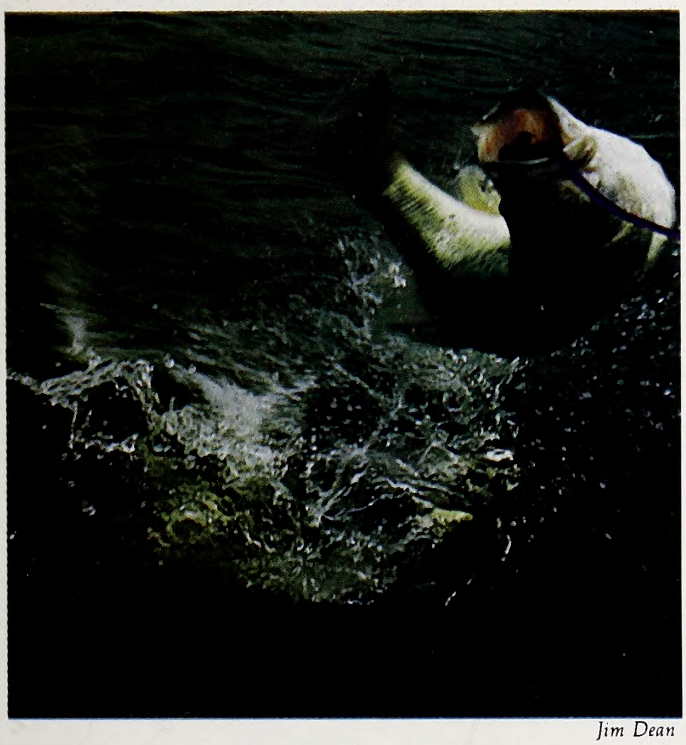
Jim Dean is associate editor of WILDLIFE IN NORTH CAROLINA. He interviewed Division of Inland Fisheries' biologists to get this roundup of North Carolina's many bass management and research programs.



Classical Bass

by Jim Dean

This is the way it was, or at least the way I remember it.



Jim Dean

My grandfather, Will Dean, almost always wore a coat and tie when he was fishing. In many ways, he was a progressive man, but his fishing habits reflected an earlier, more genteel period of history. The wearing of a tie while fishing was not snobbery; indeed, he was likely to wear the very same well-worn outfit to a Kiwanis meeting, much to my grandmother's exasperation.

It was more a matter of habit, and habits are comfortable. In time, habit becomes tradition, and that's where I come in. I first began to fish with grandad when I was seven or eight years old.

We fished for bluegills and crappie a lot back then though I spent most of my time playing in the minnow bucket. But even before I could handle a plug-casting outfit, I was intrigued by largemouth bass. I listened to the stories my grandfather swapped with his friends. I longed for the day when I would go with them to such exotic places as the Chowan River or Wiccacon Creek or William's Pond (Merchant's Mill Pond). Most of all, I wanted to go with them to Fort Landing on the Little Alligator River where they had a ramshackle cabin set on pilings over a marsh in the mouth of the river.

I spent hours looking through grandad's tackle box, marveling at the huge wooden plugs with glass eyes, the bamboo and steel casting rods and his old Pfleuger Supreme casting reel filled with black line.

When I was nine years old, he gave me a tackle box (I still use it), and a Shakespeare reel and rod. After that, things got serious and the dreamed-of trips to the Chowan and other eastern blackwater rivers became a reality. For some reason, however, I could not seem to catch bass with any consistency. Sure, there were occasional runts in the 10-inch class (and I still remember some of them), but the real trophies avoided me.

The summer I was 12, I spent two weeks in the shack at Fort Landing. During the day, we floated the dark, wind-streaked water in the 16-foot gray juniper boats with cane poles fanned out over the stern. We caught plenty of fat, white perch, but no bass. During the early mornings and late evenings, I prowled the narrow boardwalks around the cabin and across the marsh, casting a small jitterbug along the edge of the grass. Sometimes, I'd paddle one of the boats to a nearby cove, but I could not catch a bass.

As the first week passed and the bassless days flew by, I became desperate. One day, grandad took me on a special bass fishing trip, but the expedition ended when the cranky old outboard caught fire and I jumped over the side of the boat.

On the last day, I sneaked out of the cabin at daylight and fished the line of grass that lay between the main house and the johnny that sat on spindly poles over the water like some huge, gray heron. I had no strikes.

Then I crossed one edge of the marsh on another narrow boardwalk and fished the pilings where the old boathouse had fallen in years before. All was quiet except for the muffled pounding of the Delco generator and the slap of water under the house.

The family awoke and began washing dishes and packing. The boats were being loaded, but I didn't help. I was on the end of the boardwalk, casting. I have paid my dues, I thought. Two weeks worth. The Little Alligator owed me a debt. Now it was time for the payoff. I was casting furiously.

Voices were calling me. The boats were loaded and the outboards were running. Not yet. Not yet. Just one more cast. He's down there in that water. I know it. One more. Finally, dad gently led me to the boat and we cast off. I think I might have been crying.

There were other trips to Fort Landing, and I eventually caught a few bass there, but these were special trips that took place only once in a while. It was a small 33-acre blackwater mill pond called "Bluegill" that finally molded my life-long obsession.

Grandad belonged to the club that leased the lake and on Sunday afternoons after church and fried chicken, we would drive 15 miles to the old lake and fish its ancient, stumpy waters. I caught my first panfish there when I was about eight, but Bluegill's bass were like those in the Little Alligator. There were some very large ones, but you paid a steep price even for the small ones. Grandad was more philosophical. If we didn't catch fish, he said we weren't "holding our mouths right."

Grandad would get a good one occasionally. I still carry the image of a six pounder he took on his old split bamboo casting rod with a Johnson Silver minnow and pork rind one crisp fall day. I can see that massive, pale

Some of these lures (left) are nearly 75 years old, and although they will still catch fish, modern bass tackle is far more efficient and productive. Early morning (below) is a time of magic for the angler.

fish flopping heavily in the dry leaves in the back of the boat.

One muggy summer day, grandad missed another big fish, and we spent the following week planning strategy. That weekend, we went back to the lake, but we avoided the bank and the log where Ol' George (we had given him a name) lived. Then, late in the afternoon, we got everything ready. I wanted him to catch it. It was his fish. Grandad tied on a Creek Chub minnow with propellers on both ends, and we quietly drifted down the bank towards the log, passing up all the other likely spots. When we were in position, grandad made his cast. It landed at the base of the log next to the bank. The circles on the water fanned and died. All was still.

Grandad twitched the plug, and the bass enhaled the big lure in an explosive strike that could not have been more spectacular had someone pitched a cinder block into the water. The black line sliced the water and the fish jumped ponderously in that slow motion way so characteristic of large bass. Droplets of water flew everywhere, pure gold in the failing light. Then the bass was in the boat. I'm not sure how big he was. I'm glad I don't remember. No scale could weigh a memory like that.

My turn came a month later. I was casting a surface plug around stumps in a shallow cove when a fish boiled behind my lure. I reeled in and cast again to the same spot. My hands were shaking. The bass charged the plug and hooked himself. I played him through the stumps and into open water. After what seemed like hours, I got him alongside the boat where he lay on his side finning weakly. He looked huge. Just as grandad reached for him, the bead swivel broke and the fish sunk slowly into the dark water.

I have often wondered how things would have turned out had I landed that fish. I have concluded that sometimes the big ones ought to get away. Even though grandad is long dead and I haven't fished at Bluegill in years, I am still chasing that bass. Obsession, it seems, is often rooted in failure.

More than 20 years have passed, and bass fishing has changed for most people — myself included. I don't own a $10,000 bass boat, but it's not because I don't want one. The old steel and bamboo rods and the glass-eyed wooden plugs have been retired, and in their places are modern rods, free-spool casting reels, crankbaits, spinnerbaits and plastic worms. The language is different too. We talk of structure and thermoclines and oxygen. We use electronic gear to search the depths. Biologists study the habitat requirements, reproduction and growth rates of bass. We've come a long way, and most of us catch more big bass than ever before.

But sometimes I think about the way it was. I see grandad in his coat and tie, sitting in the opposite end of a leaky wooden boat. A tiny swirl of smoke drifts from the stubby Muriel Senator clenched between his teeth. We drift on the dark water, and he makes a cast. Somewhere out there — free from electronic surveillance — Ol' George lies under a log, waiting.

Only those of us who had fathers or grandfathers with one foot still in the 19th century will know exactly what that was like.

Jim Dean is associate editor of WILDLIFE IN NORTH CAROLINA. He lost his first big bass when he was 12. He believes that might have been a good thing, but he's not so sure about all the big ones he's lost since then.

Jim Dean

Encounter With A Nighthawk

by Jerry Reynolds

The nest of the nighthawk is no more than a slight depression in the sandy soil. The eggs and young are well camouflaged but the parent nighthawk guards the newly hatched young. For even greater safety, the little birds may be moved to new locations periodically.

It's probably more active during the daytime than at night, and it certainly is no hawk; but the common name of nighthawk has persisted. Perhaps even more inappropriate is the common name of the family in which this interesting bird is found: the goatsuckers!

The birds found in North Carolina representing this family include the chuck-will's widow and the whippoorwill, as well as the nighthawk or bullbat. They all share physical similarities of very large mouths which open extremely wide, tiny beaks, fairly large eyes, and long, narrow pointed wings.

The nighthawk is far from a secretive bird, and most warm spring or summer afternoons find them spiraling over most downtown business sections, providing aerial displays of flying skills unequaled by any other birds. These lazy upward flights, sudden plummeting dives, and breath-taking pull-outs a few feet from the rooftops, are not designed for show. The birds are feeding, scooping up insects in their gaping mouths. Any flying insect is fair game for the beneficial nighthawk: mosquitoes, winged ants, even grasshoppers and flying beetles.

Once the nighthawk disappears from the evening sky, and the characteristic "peent" call fades away, the birds are seldom found until early afternoon the following day. The well-camouflaged bird passes the daylight hours resting lengthwise on a horizontal tree limb, or on the top rail of a fence, if such is available. These mild-mannered birds are fully protected by State and Federal law.

The nighthawk shown here was discovered in Carolina Beach State Park on June 6, 1977. The adult bird and the nest likely would not have been found had she not tried the "injured bird act" to lead me away from the site. The camouflage coloration of the nighthawk is amazing and it looked as if a piece of the ground suddenly moved. On the bare ground were two eggs.

The following day, the adult and both eggs were gone, but a brief search revealed that the nighthawk had moved the nest about five feet from the original location. Both eggs had hatched and one chick's down was still damp. Again, the adult went into the broken wing performance.

Two days later, on June 9, the nest was found about four feet from the previous site. Only one chick was visible, but four days later, the nest site was discovered some 25 feet from its previous location, and this time both chicks were visible.

By June 17, we could find no trace of either the adult or the young. Apparently, the young nighthawks had matured enough to permanently leave the nesting site.

Jerry Reynolds is a graduate student at N.C. State University at Raleigh with his major interest in amphibians and reptiles. At present, Jerry is a student research assistant at the N.C. Museum of Natural History.

Get The Most Out Of Your Catch, A Few Tips For Preserving Seafood!

Saltwater anglers who wish to make prime seafood dinners from their catches may be interested in a few tips contained in a bulletin put out by the N.C. Sea Grant Program entitled "Don't Waste That Fish." A few of the tips on preserving fish are as follows:

To avoid getting a "fishy" odor and flavor from your catch, fish should be chilled immediately after being caught. Fish just out of the water are virtually odorless, but after being left in the sun for a couple of hours, the enzymes and bacteria in the fish start breaking down. This results in a fishy odor and causes the flesh to lose its firmness.

To avoid this, quick-chill the fish. Take along a tub and some crushed ice, and pour seawater over the ice. Immediately after the fish is caught, put it in this mixture to chill. After about a half-hour, remove it from the slush and cover it with crushed ice in a cooler until the end of the day when it should be frozen. Fish may be whole or gutted when iced.

If you aren't able to freeze your catch at the end of the day, you can maintain the quality of the fish by super-chilling it for up to seven days. Again, fish that are super-chilled may be whole or dressed.

To super-chill a fish, line the bottom of an insulated ice chest with about four inches of crushed ice, and leave the drain open. In another container, make a salt-ice mixture using one pound of ice cream salt to each 20 pounds of crushed ice. Arrange the fish in layers in the ice chest, and cover each layer with a generous coating of the salt-ice mixture. Always keep the lid shut securely on the chest. If salt isn't available, crushed ice will do, but fish will only keep for two or three days instead of a full week. If you plan to super-chill fillets, steaks or dressed fish, wrap them in a clear plastic film before putting them in the chest.

Freezing fish properly will also help maintain their fresh flavor. One big help is to glaze the fish with a protective solution that slows the interaction of oxygen with fish fats. This interaction causes odors and loss of freshness.

The ingredients in the glaze are unflavored gelatin, lemon juice, and water. Measure one quarter cup of lemon juice into a pint container, and fill the rest with water. Then dissolve one packet of gelatin into a half-cup of the lemon juice-water mixture. Heat the remaining liquid to the boiling point, and stir the dissolved gelatin into the boiling liquid. Then cool the mixture to room temperature before using. Fish should be dipped in the mixture making sure the glaze is heavily applied to the exposed surfaces of steaks and fillets to reduce deterioration. Wrap immediately, and freeze. Trimming the darker portions of the meat away will help reduce fishy flavors.

Frozen fish is best when eaten within three months after freezing, but it will remain acceptable for up to nine months. High fat species, such as bluefish, mullet and mackerel, have a shorter freezer life than others, but will keep well for three months if properly frozen.

The booklet also contains more information on cooking and storing fish. For copies, write to the University of North Carolina Sea Grant Program, 1235 Burlington Laboratories, N.C.S.U., Raleigh, NC 27607. —*Mark Taylor*

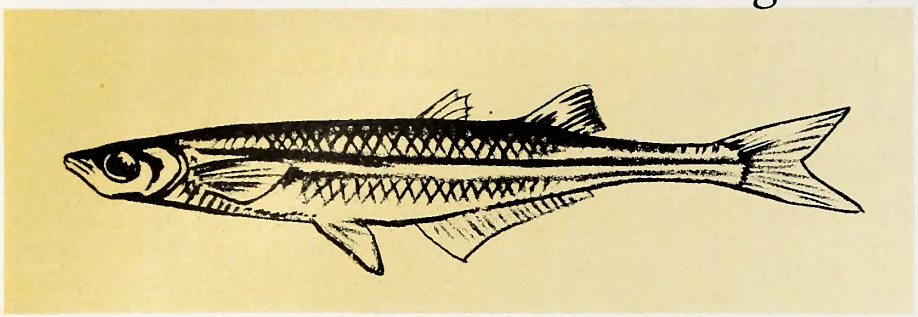
This nice catch of flounders and gray trout could quickly spoil unless steps are taken to properly chill them. Use of a mixture of rock salt and ice will give you the best results.

Getting Skunked In Java

Scientists have discovered a fearsome new creature in Java, according to a recent issue of *Outdoor Life* magazine.

The new critter is reported to be a giant skunk about the size of a dog, which can climb trees. Scientists speculate that the animal has existed since prehistoric times. Where do these critters sleep? Anywhere they want to!

Lake Waccamaw Fishes Endangered



On December 30, 1977, the U.S. Fish and Wildlife Service published in the Federal Register a proposal to designate as endangered three species of small fish that appear to live only in Lake Waccamaw or its immediate vicinity. Federal regulatory procedures call for public input on such proposals as well as a formal response from the Governor. Review of the proposals by the Wildlife Commission staff as well as the State's Endangered Species Interagency Task Force and Endangered Species Advisory Committee resulted in a decision to oppose designation at this time.

The decision to oppose designation was in line with local public opinion as well as that of representatives of the scientific community. The decision was based on the many factual errors found in the Service's contention that the quality of water in Lake Waccamaw was deteriorating and was adversely affecting the habitat and survivability of these species. While this might have been true several years ago, the Service was apparently not aware that a modern sewage treatment facility had been constructed to serve the town and houses that ring the lake. They were apparently also not aware that drainage canals dug to provide homesites do not drain into the lake and that there is actually very little potential for excessive enrichment so as to cause oxygen depletion.

The State and local residents are not opposed to official designation of species that require extra protection if they are actually endangered. But there really is no evidence at this point that these species are reduced in numbers from what they were several years ago. The fact that they are restricted in distribution to this locality does not necessarily mean they are endangered, particularly if local regulations are designed to maintain water quality and other essential habitat elements.

It appears that what is needed is an in-depth study of these species, their characteristics and habitat requirements and an assessment of the likelihood of providing these requirements under existing management programs. Actually, North Carolina biologists tell us that there are 14 other species in this area that are sufficiently rare to warrant study. If the U.S. Fish and Wildlife Service approves the State's proposals, the Wildlife Commission will be soliciting the local scientific communities for studies to fulfill these needs. Lake Waccamaw residents have said that they would favor official designation of local species as endangered, but only if carefully conducted studies showed the actions were justified.

Official designation of these species as endangered, and designation of Lake Waccamaw as "critical habitat" would probably have little, if any, impact upon the economic development of the area. The Federal Endangered Species Act requires that Federally sponsored or funded programs be carefully reviewed to assure that they would not adversely affect "critical habitat." This involves review of such programs by the U.S. Fish and Wildlife Service and in some cases it could involve modification of the project to prevent anticipated damage. In a recent case in another state, construction of a federal highway through a critical habitat area was modified to require federal acquisition of bordering lands so as to preclude commercial or residential development within the critical habitat area. Thus the highway was built, and the sanctity of the critical habitat was preserved.

The unique and highly scenic qualities of Lake Waccamaw deserve to be preserved. On this point, all parties agree. All that remains now is how to go about doing that first.

—Frank Barrick

Fiberglass Boat Work Not Difficult

Although most modern pleasureboats are made of fiberglass, the average boat owner has never had a chance to actually work with this material. So where the boating enthusiast of yesteryear found it easy to attach accessories to wooden dashboards and cockpit coamings, to many a modern fan the way to do the same thing on fiberglass is a big mystery.

Most boat rigging authorities emphasize that it's really very easy to install equipment on fiberglass. The work can be done with common tools, and there is simply no danger of making starting places for cracks.

Once a person has the knack of doing it, he can install all kinds of items on fiberglass surfaces just as easily as wood. Round holes are easily made with common twist drills and hole saws. Rectangular or irregular-shaped holes are equally easy to make with a saber saw and fine-tooth blade. Edges can be smoothed and rounded with files and high-grade abrasive paper. Occasional use on small fiberglass jobs won't hurt cutting tools, although prolonged use does make sharpening necessary more often.

It's best to drill holes from the gel coat, or colored, side. If you start from the back side, the gel coat around the hole may chip when the point of the drill comes through. Put masking tape on the surface to be cut and on it draw pencil lines to guide your saw.

There are only a few precautions. Don't make holes so large as to obviously weaken such areas as dashboards and decks. And don't breathe the fiberglass dust. It isn't poisonous, but too much of it over a period of time isn't good for the lungs.

Fish Print Series On Sale

The N.C. Wildlife Resources Commission is offering a set of six full-color prints of popular Tarheel game fish as long as present stocks last. These prints are approximately 8½ by 11 inches plus ample margin, and are ready for framing. The set, which includes the largemouth bass, brook trout, black crappie, smallmouth bass, bluegill, and rainbow trout, is $10 postpaid. Individual prints are available for $2 each.

A leaflet describing each fish and its habits is included. These prints, on heavy stock, are reproduced from original paintings by Duane Raver, editor of WILDLIFE IN NORTH CAROLINA, and all but the bluegill have appeared on the covers of the magazine in past years.

While prints are still available, send your check or money order along with your complete name and address to Fish Prints, Wildlife Commission, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611.

Price Of Turkey Was Sky High

The price of an illegal wild turkey in some states runs pretty high according to **Turkey Call** magazine, the official publication of the National Wild Turkey Federation.

In northwestern Missouri, an illegal turkey cost two men $1,532. The two men were charged with shooting a turkey out of season, shooting from a motor vehicle, and shooting from a public road. They also forfeited $766 in bail when they failed to appear in court at the appointed time.

The judge trying the case commented that there was no excuse for killing the bird, and that since local residents feel very strongly about the wild turkey, he felt the penalty should be severe. He added that although the two men were nonresidents, he'd have treated a resident the same way.

Figuring the costs of the fine and the forfeiture of bail, the cost of that turkey turned out to be about $76 per pound.

Courtesy Boat Inspections Slated

The U.S. Coast Guard Auxiliary will be holding a number of Courtesy Motorboat Examinations throughout the Piedmont. Although these examinations are voluntary, auxiliary members will inspect boats and point out any unsafe conditions on the vessel. The schedule for the examinations is as follows:

The examination on Lake Norman will be held on Sunday, July 2 from 12 noon until 5 p.m. at the McCrary Creek Access Area.

The examination on Belews Lake will be held on Saturday, August 12 from 10 a.m. until 4 p.m. at the Carolina Campin' and Marina.

Another examination on Lake Norman is scheduled for Saturday, August 26 from 10 a.m. until 4 p.m. at the Midway Marina.

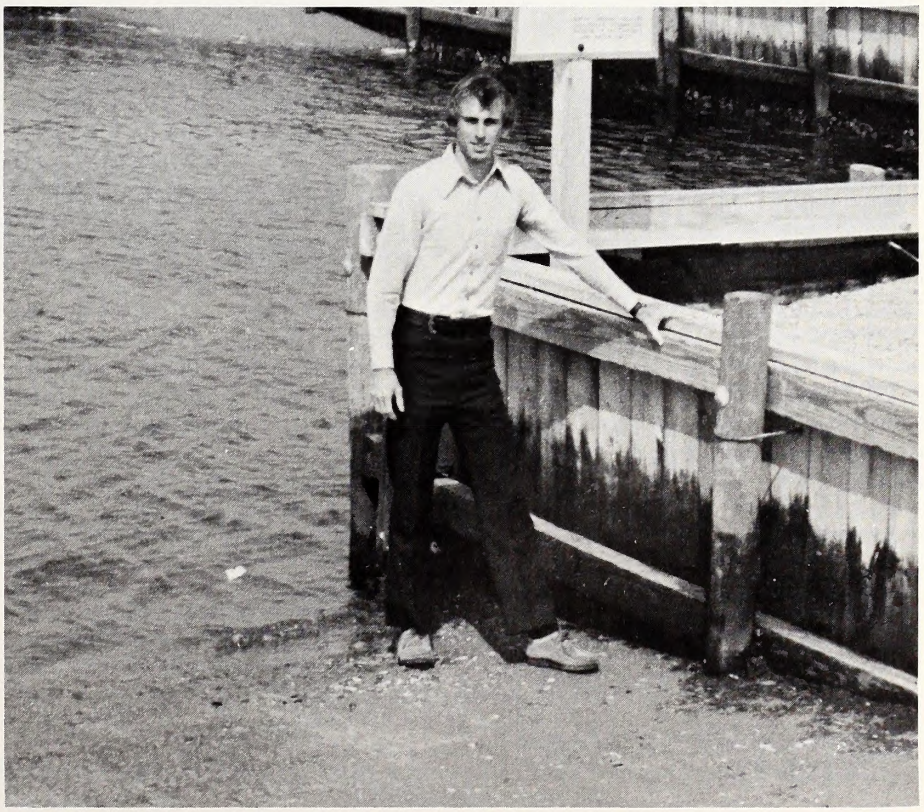
Coastal Advice Available

Coastal landowners who are losing their property to the sea now have a new source of advice. The University of North Carolina's Sea Grant Program has hired Spencer Rogers as extension coastal engineer.

Rogers will be available to advise landowners how they can build retaining walls, bulkheads, and take other steps to control the erosion of waterfront property. He will also be available to help marinas and other coastal businesses that are suffering from erosion and sedimentation problems.

Public education is the most important step in solving coastal engineering problems according to Rogers. If people know what to look for when they buy coastal property, then they can minimize the problems at the start. Parts of North Carolina's coast are currently eroding at the rate of 15 to 20 feet per year.

Rogers will work out of the N.C. Marine Resources Center at Fort Fisher and can be reached at 919-458-8257.



Spencer Rogers is the Sea Grant program's newest agent on the North Carolina coast. He is a coastal engineer, and will be available to landowners to give advice on how to solve their coastal engineering problems. Before coming to North Carolina, Rogers worked for the Florida Bureau of Beaches and Shores for three years as a coastal engineer. *Andy Summers (N.C. Sea Grant Program)*

Book Review

"Texas Wildlife" by David Baxter, Ted L. Clark and John Jefferson
Texas A & M University press
Drawer C, College Station, Texas 77843, $22.50

It's not often that WILDLIFE IN NORTH CAROLINA reviews publications on wildlife from other states, but "Texas Wildlife," subtitled "Photographs from Texas Parks & Wildlife Magazine," very likely will be of interest to many of our readers. Except for six or seven pages on wildlife management in Texas, this is a fine collection of wildlife photos, many of which are full-page presentations (8 x 11 inches) printed on very high quality paper. In this day of high publication costs, $22.50 isn't bad at all for 232 full-color illustrations bound in a quality binding.

The only items I kept looking for, and didn't find, were photos of fish. But mammals, birds, reptiles and amphibians are well represented.

Introducing The Bionic Bear

A wildlife biology student in Simon Frasier University in Canada may well have come up with the solution for problem bears, at least in some cases, according to the National Wildlife Federation.

Ever since the oil boom hit the arctic, oil companies have had runins with problem polar bears around some of their camps. Understandably, this upset many of the oil workers, so the oil companies had to come up with a way to scare bears away from where the roughnecks were working.

What the student came up with is a "bionic" bear or a recorded roar that he amplifies with a synthesizer. This makes unruly bruins believe that the world's biggest, baddest bear is just over the next hill, and is headed their way.

To create this commotion, the student threw a piece of meat between two caged polar bears in a zoo and then recorded the forthcoming fearsome fracas. By isolating the sounds on a spectrum analyzer and using special effects, the student was able to make the recorded roar much louder and longer than the real thing.

I can understand how the system would work. If I were caught in an act of wrongdoing and suddenly I'd heard a tape recorder of Muhammed Ali announcing that he was about to "give me a whupping," I'd take off too. *—Mark Taylor*

March Enforcement Report

For the month of March, 1978, the North Carolina Wildlife Resources Commission checked a total of 11,865 hunters and fishermen and 2,572 boaters.

Of the hunters and fishermen, 561 were prosecuted and 485 convictions were obtained. The total fines collected tallied up to $8,874.50 and the total costs collected were $10,456.50.

Of the boaters, 52 prosecutions were made and 38 convictions obtained. Total fines collected tallied up to $90 and total costs collected were $900.

Other prosecutions totaled 23 and convictions totaled 18. Total fines collected tallied up to $15 and total costs collected tallied up to $297.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

Ocracoke Kids Aid Brown Pelican

The brown pelican, "whose beak can hold more than its belly can," now has a new group of friends defending its interests. The fourth and fifth grade classes at Ocracoke School held a bake sale to aid the birds, and sent their $25 check to the Carolina Conservationist Program sponsored by the N.C. Wildlife Resources Commission to aid nongame and endangered species. The letter reads as follows:

"We had a bake sale to raise this money to preserve the brown pelicans. We don't want them to become extinct. We live on Ocracoke. We like to see the pelicans around our island. We would miss them if they were gone. Please send us the picture of pelicans with Ocracoke in the distance. We are going to put it in our school."

The picture is on the way, and the $25 will be used to aid the brown pelicans; thanks to these Ocracoke classes. *—Mark Taylor*

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Nature's Ways

by Duane Raver

photographs by Ken Taylor

Camouflage, Nature's Protective Cover

The Carolina anole (often mistakenly called a "chameleon") has the ability to alter the color of its skin to match the surroundings. This process is not precisely understood, but it is apparently an "automatic" constriction and enlargement of the chromatophores or skin pigment cells. A limited number of hues are possible, however, and the process takes a minute or more.

Nature has many ways of protecting her own. Some wild critters are endowed with flashing speed, escaping danger by speedy flight or fleet feet. Others rely on strength, sharp claws, and strong jaws to fight their way out of tight situations. But those wildlife species which seem to be lacking in any of these protective devices, usually depend on blending into their surroundings with fur, feather or skin colors remarkably similar to those of their habitat.

This protective coloration is often called "camouflage" and has been copied by man in many ways. The uniforms and vehicles of armies worldwide take on strange hues and patterns in an attempt to melt into the background and thus escape detection by the enemy.

Many birds and several mammals actually change their coloration seasonally, and their coats gradually take on the tones and patterns of the surroundings of the season. The varying hare, the snowshoe rabbit, the ptarmigan, and others, fade from greys and browns to almost pure white as winter and snowy ground approaches. Some may get fooled temporarily with their white dress when no snow comes to hide them.

The young of almost all wildlife are specially endowed with tones that perfectly match their surroundings. Newly hatched bobwhite quail and grouse, for example, simply melt into the dead leaves and grasses of their nesting area when these tiny birds remain motionless. The females of most bird species are dressed in outfits of less conspicuous shades than their mates, since they require even more protection when they are confined to the nest.

Fish follow a general pattern of dark backs and light underparts since their enemies from above view them against a normal dark background, and the predators from below look at them against the lighter sky coloration. Body coloration can be changed drastically by fish, or this may even happen automatically when some sudden danger appears, or they are frightened in some other way.

The Carolina anole, a six-inch reptile found now and then among summer's foliage, is often mistakenly called a "chameleon" since it does have the skin coloration changing ability.

Camouflage doesn't always protect the critter, and the predator's sharp eyes may detect the prey anyway. But this is nature's way.

Ken Taylor

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A warm afternoon, a small boat, and an occasional cooperative fish make a delightful blend. Just be sure you wear a Personal Flotation Device (life jacket) and follow other safe boating practices. Safe boating is a year-round endeavor.

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WILDLIFE IN NORTH CAROLINA

JULY 1978

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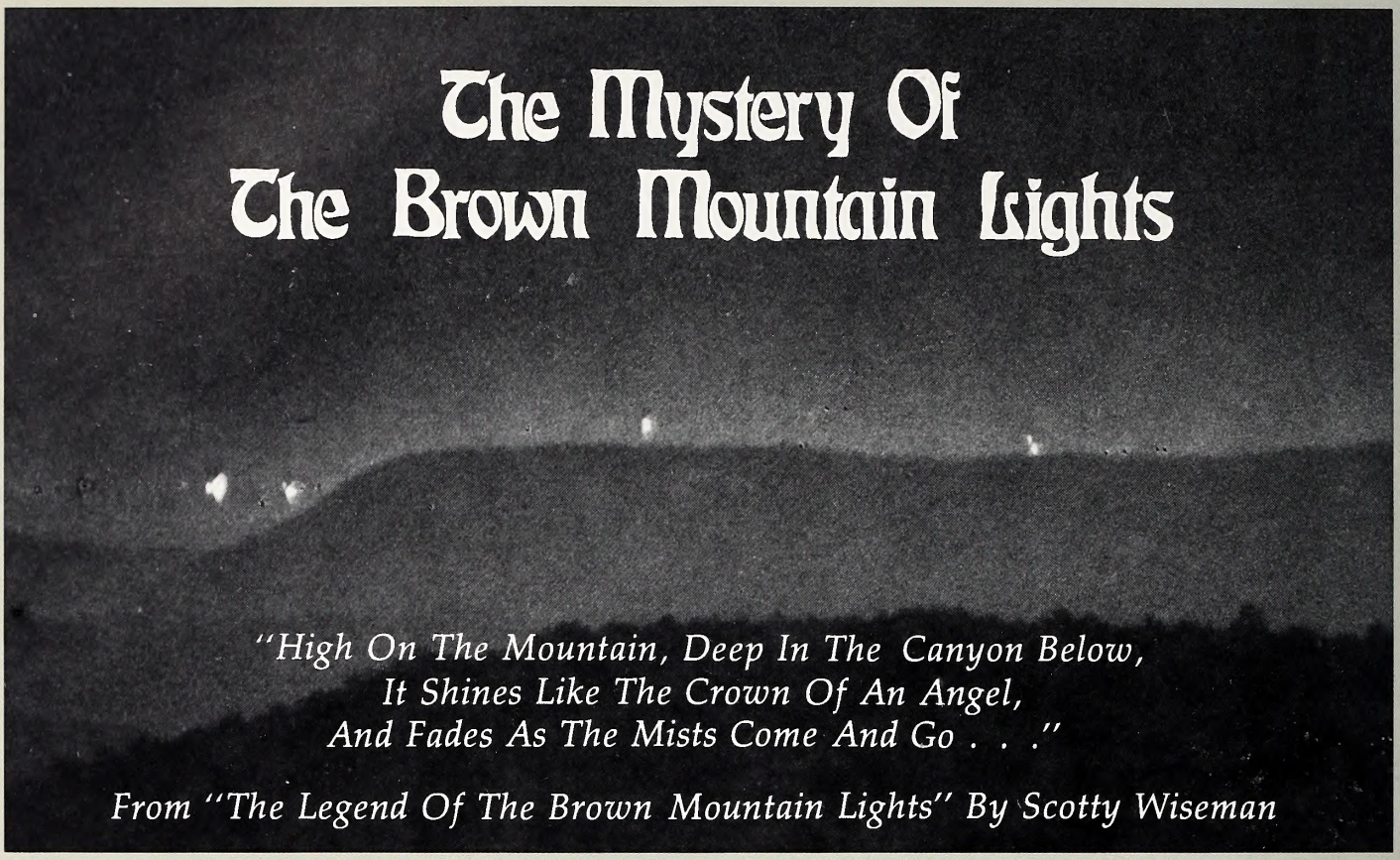
Our Natural Heritage

by Jim Dean



From the overlook on N.C. 181 south of Jonas Ridge or from Wiseman's View, you can look across the valley to the long ridge called Brown Mountain. At times — some say on a moonless midsummer night — you can see the legendary Brown Mountain Lights.

Most people who have seen them say they usually rise from somewhere below the crest, then hover in the air over the ridge. Some say they drift slowly, fading and brightening. Others say they sometimes appear to whirl like pinwheels, then dart rapidly away.

That lights of some sort appear is indisputable, yet that is just about the only thing that anyone seems to be able to agree upon. Theories have been advanced that the lights are caused by escaping methane, moonshine stills on the mountains or simply phosphorescence. Because the Brown Mountain ridge is below the horizon when viewed from Jonas Ridge or Wiseman's View, other theories strongly suggest that the lights are simply from cars, trains or from houses and villages in the distance beyond the mountain.

Indeed, one U.S. Department of the Interior study by George Rogers Mansfield in 1922 discredits all mystery and flatly states that "about 47 percent of the lights that the writer was able to study instrumentally were due to automobile headlights, 33 percent to locomotive headlights, 10 percent to stationary lights, and 10 percent to brush fires." Mansfield's study was published in 1971 by the Department of the Interior on Geological Survey Circular 646.

Mansfield makes what appears to be an ironclad case for his findings — except for one thing. The Brown Mountain Lights have been part of the legend of this area since long before the appearance of automobiles, trains or settlement by white men.

The lights are part of Indian mythology, and Geraud de Brahm, a German engineer who was the first white man to explore the region in 1771, mentioned the mysterious lights in an account of his travels. Why would Mansfield ignore this information? Who knows.

Undoubtedly, many of the sightings of the lights are exactly as Mansfield suggests. Experiments have shown that thermals (warmer air) rising on either side of a ridge like Brown Mountain can produce curious effects on lights when viewed from certain angles.

But the fact that the lights are part of earlier legend cannot be adequately explained. Nor is there a satisfactory answer to the regular appearance of the lights following the 1916 flood when no trains and few automobiles were in use in the area.

More recently, the discovery of uranium in the area has fueled new theories in the search for a plausible answer to the phenomenon. One geologist has said that he has seen similar lights on other mountains rich in uranium, but other experts have stated that this is impossible. Such dispute is typical of the Brown Mountain Light mystique.

Maybe Scotty Wiseman had it right in his old bluegrass song about the legend. Maybe it's the lantern of a slave's ghost who endlessly searches the mountain for his master who was lost while hunting many years ago.

Whatever the case, there are a heap of folks who hope the mystery is never solved.

WILDLIFE IN NORTH CAROLINA

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Volume 42, No. 7 *July, 1978*

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Experts believe the cougar or mountain lion may be making a limited comeback in North Carolina.

Back Cover *Photo By Ken Taylor*
Alligators are listed as an endangered species, but they are still fairly numerous. This small one was spotted in Orton Pond.

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Our Endangered

Fifteen species of wildlife are endangered in North Carolina. Some may already be extinct. Here's how they got that way.

Karl Maslow

Aldo Leopold, the naturalist, writer and conservationist who is widely accepted as the father of modern wildlife management, once said that "To keep every cog and wheel is the first precaution of intelligent tinkering."

His insight was keen but we have failed to take heed. As we progress in time, increasing numbers of the "cogs" and "wheels" are being removed from what were once intact and functioning ecosystems; not knowing if, or when, they will be needed in the future to keep the systems working.

For example, the vast flocks of passenger pigeons that once darkened the skies of much of the eastern United States, including parts of the Piedmont and Mountains of North Carolina, are now gone. And, as colorful and unique as it was, the Carolina parakeet, which once adorned the swamplands and hardwood forests of eastern North Carolina, has joined the woods bison and elk that once enlivened our landscape, never to be seen or admired again. All are extinct in North Carolina. Gone.

I can't truthfully say that I miss them, for it is difficult to miss a species, be it animal or plant, that cannot be seen or touched or otherwise experienced in its living form. Stuffed, lifeless museum specimens, photographs and artwork cannot convey the life spirit of an extinct species to one who came along too late to see it firsthand.

There are 15 species of wildlife found in North Carolina which are now officially recognized as endangered by both the State of North Carolina and U.S. Department of the Interior. By endangered, it is meant that they are in imminent danger of becoming extinct in all or part of their range.

Some endangered species, such as the ivory-billed woodpecker, may already be lost from North Carolina as well as to the rest of the world; and others, such as the peregrine falcon and bald eagle may have already been eliminated as reproducing populations from the Tar Heel State.

The losses we have incurred are ones which should be grieved, but not so much so that it detracts from efforts that have to be made to ensure the survival of endangered species and to make the necessary changes in man's activities that cause steadily increasing numbers of wildlife species to decline alarmingly. Joseph Wood Krutch summed it up when he said, ". . . for every creature there is a paradox at the heart of the necessary 'struggle for existence' and the paradox is simply this: Neither man nor any other animal can afford to triumph in that struggle too completely."

The following is an account of the 15 endangered species presently listed in North Carolina. Experts in the field recognize numerous other species as threatened or possibly endangered in North Carolina as well, but these have not been officially adopted by the State and Federal governments. As more information is gathered on them, more species may be added later.

By Curtis Wooten

Wildlife

Karl Masklowski

ıe American bald eagle is perhaps the nation's most famous en-ngered species because it is also a national symbol. There are no own active eagle nests left in North Carolina; but at one time, ob-rvers could still find young eagles in nests in coastal areas.

rl Masklowski

Bald Eagle

The bald eagle, despite its size, beauty, regal appearance and its status as our national symbol, may well be extirpated as a breeding population from North Carolina.

They were once quite common along the coast, nesting in several counties and frequently seen in other parts of the state. Today only a modest few are seen each year as they migrate through the state and even fewer in the coastal region. No active eagle nests have been found in recent years despite numerous aerial surveys of wintering and former nesting areas.

As with many other top level carnivores, there was a significant decline of the eagle population after the introduction and widespread use of chlorinated hydrocarbon pesticides in the late 1940's. Other factors involved in its decline include illegal shooting (accounting for 54 percent of the reported deaths in 1972), past bounties, as in Alaska, electrocution by power lines and severe weather affecting productivity.

Efforts are being made to identify potential nesting sites and winter roost areas; if eagles begin nesting here again, special efforts can be made to protect nest sites and surrounding habitats.

Indiana Bat

The Indiana bat is a medium-sized, gray to light brown bat which feeds on flying insects at night. In winter it hibernates in large clusters in caves, and in summer it roosts in hollow trees or under loose tree bark. These bats are endangered throughout their range which includes much of the eastern United States and the midwest.

Only nine specimens, all from the mountain region, have been found in North Carolina which is on the edge of its range. There is a possibility Indiana bats winter in some of the caves found in the North Carolina mountains, but this has not been substantiated.

Projected studies of the Indiana bat here would concentrate on determining if they do in fact utilize North Carolina caves all or part of the year and, if so, which ones. If they are found to use our caves, special efforts can be made to protect both the individual bats and their cave habitat.

Gray Bat

The gray bat, a cousin of the Indiana bat, is also on the North Carolina and federal endangered list. It is not known to frequent the state in any significant numbers. Only one specimen has been found in the state, near Asheville, in Buncombe County, and it was considered to be a vagrant.

It is on the North Carolina endangered list to provide it full protection of the law should a colony be located in the future.

"To keep every cog and wheel is the first precaution of intellige

Curtis Wooten

The Brown Pelican

The brown pelican is the only pelican which nests in eastern North America. Although a couple of small islands in Albemarle Sound represent the northern limit of its nesting territory on the Atlantic Coast, adults and juveniles can be seen all along the North Carolina coast, particularly in the spring and summer months.

The U.S. Fish and Wildlife Service estimates that there were as many as 90,000 to 95,000 of these stately sea birds in southeastern United States in 1950 — mostly in Florida and the Gulf Coast area. The population is now down to an estimated 20,000 to 25,000 birds and the species is listed as endangered throughout its range. A rapid decline in the brown pelican population, directly attributable to pesticide build-up in the environment, occurred in the late 1950's and early 1960's.

With the identification of several of the most persistent and harmful pesticides and their subsequent removal from widespread usage, the decline of pelican numbers has been checked in many areas. Unfortunately, pesticides and other environmental pollution problems still persist and the species is far from being out of danger.

The North Carolina brown pelican nesting colony consists of only about 200 birds, but the colony has always been small and has not declined significantly despite problems in other states.

Current research efforts in North Carolina are aimed at obtaining basic information on the habitat of the bird; determining why they limit themselves to only

The brown pelican population has dropped sharply in many Atlant and Gulf Coast states, but these interesting birds seem to be holdin their own in North Carolina, although they were never abunda here. This rookery (above) is on Ocracoke Island.

Leonard Lee

t tinkering." -Aldo Leopold

Ken Taylor

one nesting site, how they can be induced to occupy other sites, and mortality factors, food habits, and other life history elements.

Ivory-billed Woodpecker

Only a single ivory-billed woodpecker has ever been collected in North Carolina. That one was taken by a Mr. Alexander Wilson about 12 miles north of Wilmington around 1800. No other confirmed sightings have been recorded since.

Ornithologists consider the ivory-billed to be extirpated in North Carolina and there is a strong possibility that it is now an extinct species. No confirmed sightings have been reported anywhere in over 40 years.

The bird is on the North Carolina endangered list, as well as the federal endangered species list, to offer them the full protection provided endangered species should they be found again.

Kirtland's Warbler

The status of Kirtland's warbler is much the same as Bachman's warbler in North Carolina, although it is a bit more common as an occasional migrant through the state. Neither species nests or spends any appreciable amount of time here.

Both Kirtland's and Bachman's warblers are in trouble primarily due to massive habitat changes in their wintering territories in Cuba and the Bahamas and due to some adverse habitat changes in their nesting territories in the northern United States.

Live Or Let Die?

by Jim Dean

Who pulls the trigger? Who decides what survives on this earth, and what passes into that infinite darkness we call extinction?

More to the point, what is worth saving and what should we let go? Are there compelling reasons to save the American bald eagle, the whooping crane, the snail darter or the furbish lousewort? Or to bring it closer to home, is the perpetuation of the Venus'-flytrap or the red-cockaded woodpecker a vital issue?

Is the extinction of a plant or animal species unnatural and therefore something to be prevented at all costs? Or is extinction an ongoing, natural process — the expected by-product of evolution?

Tough questions. You would anticipate that the sentimentalist who has learned wildlife biology from Walt Disney will protest that all creatures must be protected regardless of the consequences. On the opposite end of the scale, you'll find the hard-core developer who looks at nature as a resource to be exploited.

Most of us fall somewhere between these two extremes. We're simply not sure what should be done. We may feel that the bald eagle should be saved (it is, after all, the national symbol), but we're not sure about the Devil's Hole pupfish.

It may be some consolation to know that scientists do not always agree on these matters.

From a purely scientific standpoint, extinction is a perfectly natural thing. Almost everyone is familiar with Darwin's statement about the "survival of the fittest." Unfortunately, many people wrongly interpret this concept to mean the "survival of the strongest." Actually, what Darwin meant was that those species which are able to best adapt to a changing environment are most likely to survive.

For example, the opossum is certainly not as strong as the Eastern cougar; yet the opossum is able to live — even prosper — in a habitat that is dominated by man. You even see opossums in the middle of cities. Cougars, on the other hand, have been unable to adapt to the rapidly changing habitat, and the prospects for their long-term survival depend upon the amount of wild habitat we can save for them.

In the cougar's case, man has been largely responsible for the plight of these cats. Yet, in other cases, man's activities may have had little or no adverse effect on a particular species.

continued on page 7

"...is extinction an on-going, natural process - the expected by

Leonard Lee R

Mountain Lion

The panther, cougar, or mountain lion, as he is alternately known, once roamed and ruled the forests of North Carolina. Its only natural enemy is man. One enemy, in this case, was all that was necessary to decrease their numbers to the point that, for all practical purposes, they were eliminated from North Carolina forests.

Due to a lack of understanding of the animal, and fear, early North Carolina settlers hunted the mountain lion mercilessly. A cougar shot in the Great Smokies near Bryson City in the mid 1930's is considered the last confirmed kill. The elimination of deer herds from most North Carolina woodlands by the early 1900's no doubt played an important role in their decline as well. Deer were, and still are, the primary food for cougars.

There are, in all probability, a few cougars to be found in the remote mountain regions of North Carolina and possibly in some of the eastern swamps as well. Conditions are probably more favorable now for an increase in their numbers than they have been in the past 80 years. Many mountain areas, including the vast U.S. Forest Service holdings and the Great Smoky Mountains National Park, are much less densely populated today than they were at the turn of the century. The animals are fully protected by law now and with the reintroduction of the white-tailed deer and subsequent growth of the deer herd, a plentiful food supply is present.

The Museum of Natural History has been investigating and cataloging all reported sightings of cougars in the state for the past three years. Also, the U.S. Forest Service is beginning a five-year study to try to determine the abundance and distribution of the cougar in the Southern Appalachians.

Spotfin Chub

The spotfin chub is a small minnow, about three or four inches long, found only in the upper Tennessee River system in North Carolina. It prefers shallow gravel riffles with moderate to fast currents in medium-sized streams and small rivers. In North Carolina, the Little Tennessee River from Franklin to Fontana Reservoir has been designated as critical habitat. It is the most recent addition to the North Carolina endangered list.

roduct of evolution?"

Leonard Lee Rue

he Eastern cougar or mountain lion was extirpated in North arolina over a century ago, but recent sightings and evidence (hair nd tracks) indicate that at least a few of these fascinating cats may ave returned.

Old records indicate that it once was found in the Swannanoa River near Asheville and in Spring Creek near Hot Springs in the French Broad River system, but despite repeated sampling efforts, it has not been found there recently.

Shortnose Sturgeon

The shortnose sturgeon, an anadromous fish, is another species that has likely been extirpated from North Carolina. It has never been plentiful here but once was known in the Albemarle and Pamlico sounds and eastern tidal rivers. It spends most of its life in salt or brackish waters but ascends fresh water rivers in the spring to spawn. Habitat destruction (channelization and dredging) which reduced bottom vegetation on which it fed and altered the bottom substrate upon which it spawned, combined with over-fishing by man, are suspected to be the main reasons for its decline.

Atlantic Leatherback Turtle

The Atlantic leatherback turtle is the largest species of turtle known in the world today. Adults are known to grow up to six feet in length and weigh up to 1600 pounds. Instead of a hard shell with horny plates, their body is covered by a keeled, leathery skin. It is an open-ocean species that occasionally moves into the sounds, estuaries and the mouths of rivers. The females come ashore once a year to lay their eggs.

Fewer than a dozen sightings have been recorded in North Carolina, most of these just off our coast. Several adults have been reported off the Outer Banks in recent years and one adult, weighing nearly 800 pounds, was found in the Neuse River near New Bern in 1975. Only one occurrence of their nesting on North Carolina beaches has been recorded, and that instance was near Cape Lookout in 1966.

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Some plant and animal species require such specialized environments that their prospects for survival were never good. The truth is that under the evolutionary process which has been going on at least since the beginning of life on this planet, extinction is a common and expected occurrence. In nature's random process of continuous change through evolution, there are many dead ends.

Certainly, man had nothing to do with the extinction of the dinosaurs. These creatures were the most powerful that ever lived on this planet, but they could not adapt to the changing climate brought on by the ice age. They could not adapt, therefore, they became extinct.

The same sort of process continues today, and it will continue indefinitely. Mankind may even join the dinosaurs at some point in the future.

If extinction is a natural process, why should we worry about it? If whooping cranes can't hack it in the 20th century, why not simply bid them fond farewell?

There are plenty of people — including some scientists — who believe that this is the only practical solution.

And yet, this attitude is dangerous from several standpoints. For one thing, many species of plants and animals are important parts of man's heritage. The bald eagle is an example. Some people consider heritage a weak excuse for saving anything, but there are other, far more compelling reasons.

For one thing, we are not talking about a small number of endangered species. Just in North Carolina, the list of plants and animals which are thought to be endangered or threatened is lengthy. Only 15 species of wildlife have been officially designated as endangered, but there are many more which may be in serious trouble. In 1973, an Endangered Species Committee for the state compiled a list of several hundred plant and animal species. These species are considered either endangered or threatened, although in some cases, too little is known about them to accurately assess their status. On a world-wide basis, the list of actually endangered or threatened species may reach well into the thousands.

Many, perhaps most, of these species are endangered or threatened directly through man's intense, world-wide alteration of the environment. Equally significant, this has not occurred over a period of millions of years. Man has compressed time, and his adverse influence has largely occurred during the past few hundred years. Indeed, the real crunch has come in the past few decades. In terms of evolution, this is barely a heartbeat in the history of life on earth.

Such rapid change hardly seems natural, and it could have disastrous effects in the near future. The closely related roles of the earth's inhabitants are undergoing rapid and shocking change. When one species — no matter how obscure — is lost, there are always effects on other species. It's like throwing a pebble into a pond. The circles spread widely.

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"Countless thousands of useful drugs have been derived from o

Ken Taylor

American Alligator

Since the commercial hunting of alligators was banned in 1965, the American alligator has made a significant comeback in the deep South. As a result, it has been removed from the endangered list in some states. North Carolina's waters constitute the northern fringe of the alligator's range on the Atlantic Coast and potential alligator habitat continues to be destroyed at an alarming rate. For these reasons, and because North Carolina's alligator population has not experienced the rapid expansion in numbers that other states have experienced, it remains on the endangered list here.

Sizable alligator populations are known to exist on the Croatan National Forest, on the Camp Lejeune Marine Corps Base, at Lake Ellis in Craven County, at Orton Pond in Brunswick County and at Warwick Bay in Robeson County. A few are scattered in estuarine areas and swamplands in other areas as well.

Although existing State and Federal laws protect individual alligators, they do not control the extensive adverse modification of habitat which today poses the most serious threat to the American alligator.

Current studies are concentrating on locating all existing alligator populations in the eastern swamplands, on identifying suitable alligator habitats, and on developing management programs to restore and sustain the North Carolina population.

Red-cockaded Woodpecker

The red-cockaded woodpecker is a small bird, about seven and one-half inches in length, with a "ladder back" and black nape and crown. It prefers open pine woods and can be found in mature and old growth pine woodlands in most counties in and east of Halifax, Wake, Montgomery and Anson counties. Major concentrations are found on the Fort Bragg Military Reservation, the Wildlife Commission's Sandhills Game Land and on the Croatan National Forest. The Weymouth Woods-Sandhills Nature Preserve and the Camp Lejeune Military Reservation also have significant numbers.

Nesting cavity trees, and a surrounding area of pine woodlands sufficient to sustain a woodpecker colony, are protected from logging on the Sandhills Game Lands, most federal lands in North Carolina and on the

cure plants and animals...

Ken Taylor

The American alligator has made a comeback in recent years throughout the southeast. North Carolina is on the northern edge of the alligator's range, and most are found in the southeastern part of the state. These gators were photographed in Orton Pond.

Weymouth Woods-Sandhills Nature Preserve. A red-cockaded woodpecker research project, funded by the Federal Endangered Species Program, and administered by the Wildlife Resources Commission, is presently underway. Project objectives include: determining the distribution of the species in the state, estimating the approximate population, determining population trends, defining year-round habitat requirements, and developing management procedures and applying them to evaluate their effectiveness.

Florida Manatee

The Florida manatee — a nine-foot, 1,000 pound, aquatic mammal which may have given rise to sailors' tales of "mermaids" — is generally associated with Florida waters, but it does frequent the coastal waters of North Carolina as far north as Cape Lookout during the summer months. The habitat it occupies here may be very important to the species, particularly if protection efforts in other areas are successful.

The manatee is considered endangered throughout its range by the U.S. Department of the Interior. Although their total number is not known, an estimate based on aerial surveys of winter congregations in Florida "suggests a minimum total United States population of perhaps 1,000 individuals."

Heavy exploitation for meat was likely responsible for the initial decline of the manatee. Today, the major cause of death appears to be injury from boat propellers. This, combined with an extensive loss of estuarine habitat to dredging, filling and development, has driven the manatee to the brink of extinction. Projected studies of the manatee in North Carolina will focus on determining their number and distribution in North Carolina waters.

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Because of this, many experts anticipate that without immediate action, the list of endangered and threatened plants and animals could accelerate alarmingly. It has been argued that wildlife acts as a measure of the health of the environment. And yet, it is apparent that too few people realize the implications of this. As an animal, man can hardly expect to exist in an environment that cannot support the rest of the world's creatures.

There is at least one other very important rationale for saving endangered plants and animals. How many times have you been sick or injured in your life? While it may seem far-fetched at first, it is likely that you owe your very life to some obscure plant or animal.

Countless thousands of useful drugs have been derived from obscure plants and animals. For example, Digitalis — a valuable heart medicine — is derived from an obscure plant called foxglove. Research on various plants and animals continues to yield exciting and useful drugs and medical techniques. Recently, scientists have learned that the horseshoe crab's blood can provide the most accurate measuer of certain toxic substances.

Similarly, an obscure species of fish (a member of the sole family) may well provide us with the only effective shark repellent ever discovered. Other examples are legion.

Despite this, we still commonly read attacks by ill-informed pundits on government funded research projects. Why, they ask, is the government or some university spending millions of dollars to study some obscure lizard in Africa while people are starving? The answer is that such research has often proven to be absolutely vital.

We may know — at long last — how useful the horseshoe crab can be to us, but we didn't know it for many years. What do we know about the snail darter, or the furbish lousewort or the countless other endangered plants and animals?

The answer is that if we let them become extinct, we will never know what value they might have been. We can't afford to let that happen. Somewhere out there may be a cure for cancer, as well as many other fearful illnesses.

Let the earth's endangered and threatened species slip into extinction, and we will in all likelihood be next. ◆

One significant threat to endangered species is House Bill 4167 which, if passed, would exempt certain types of projects from the Endangered Species Act. Generally speaking, the bill would exempt from compliance with Section 7 of the Endangered Species Act those federal projects that are involved in public works, navigable waters (construction or reconstruction) if such construction or reconstruction began prior to or as of January 1, 1967.

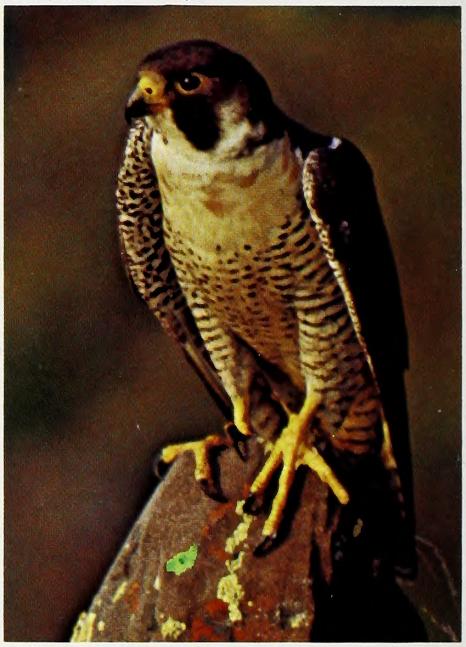
In plain language, this means that such projects as the dam on the Little Tennessee River could be finished despite the fact that it would wipe out the snail darter.

This is a dangerous piece of legislation which could conceivably gut the Endangered Species Act, especially if other exemptions are added in the future.

If you would like to express opposition, notify your congressman. Further information is available from the U.S. House of Representatives, Merchant Marine Committee, Washington, D.C. 20515.

Karl Masklowski

Karl Masklowski



The peregrine falcon no longer nests in North Carolina, but there are occasional sightings of birds as they migrate through the state, particularly along the coast.

The Peregrine Falcon

The American peregrine falcon, one of the fastest hawks, once nested on steep cliffs in the North Carolina mountains, and its cousin, the Arctic peregrine, was once quite common during fall and spring migration along the North Carolina coast. Now, only a few transient migrants are seen each year along the coast. The American peregrine has been extirpated from the state as a reproducing species.

The nation-wide reduction in peregrine numbers is, again, strongly related to the development and widespread use of chlorinated hydrocarbon pesticides (DDT, DDE, Dieldrin and others) in the late 1940's. Still, there are some indications that the birds were already in trouble by the early 1940's. They were possibly tottering in a precarious balance with nature and man, and the introduction of pesticides into the scene pushed them over the brink. The population has suffered, over the years, from collecting of young and subadults by falconers, from shooting and from 70 years of egg collecting. Aerial surveys of past nesting sites in the North Carolina mountains would help determine if a remnant population exists, and monitoring of the migrating Arctic peregrine populations would provide information on the extent of their migration.

Restocking of American peregrines to their historic nesting areas has experienced limited success, but probably offers the best hope for reestablishing the bird in North Carolina. It may be tried if captive birds become available in the future.

Bachman's Warbler

The rare and elusive Bachman's warbler has also been reported only on one occasion in North Carolina. That report came from Raleigh in 1891. The possibility of their occurrence here is heightened, however, by a report of one in neighboring South Carolina in 1976.

Their numbers are so small and their occurrence so infrequent that research and management programs would be impractical and ineffective in North Carolina. As with the ivory-billed woodpecker and gray bat, it was placed on the North Carolina endangered list to offer it full protection should it be found here.

Curtis Wooten is western field representative for the Division of Information and Education.

Where The Buffalos Roamed

By John B. Funderburg and David S. Lee

Alexander Wilson, a Scotsman and first-rate ornithologist of Audubon's era, was one of the first naturalists to study and illustrate segments of the bird life of North Carolina. In the late 1700's, on one of his many trips to the State, he found what was later regarded as the northernmost and only record of occurrence of the largest and rarest of all North American woodpeckers — the ivorybill.

This woodpecker was always considered rare, even in Wilson's time. American Indians valued its bill as a prestigious item for trade; and perhaps they had decimated the population long before the arrival of the first settlers, and extensive lumbering in the East soon destroyed most of the mature forest habitats required by this species. Nevertheless, numerous seemingly reliable reports from Florida, Texas and South Carolina suggest that remnant populations may still survive there.

While the ivorybill was probably never abundant in North Carolina, the Tar Heel State has been home to other species which, at one time, were quite numerous.

Did you know, for example, that buffaloes once roamed North Carolina? Were you aware that parakeets were once native to this State, or that elk and wolves were also part of our wildlife heritage? It's true, and it may prove interesting to learn what happened to these and other species which were a part of our past.

The last Carolina parakeet, the only member of the parrot family to breed within the United States, died in the Cincinnati Zoo in 1918. These birds had been market hunted for food, and also for feathers which were commonly used to decorate ladies' hats. Significantly, Carolina parakeets were considered agricultural pests. Unlike the ivory-billed woodpecker, which suffered from declining habitat, the parakeet's extinction was brought about by a single behavioral trait. These birds traveled in large flocks and would return at the sound of cries of wounded individuals. Thus, market hunters, if they were successful on their first shot, were able to exterminate the entire flock when it returned again and again to investigate the sounds of dying friends.

The now extinct passenger pigeons once migrated through the Mountains and Piedmont of North Carolina in large numbers. They were apparently still common through the early 1870's, but their decline was rapid and the last record for the State was 1894. Although these birds migrated in huge flocks, their appearance was always so erratic that people did not suspect a decline and assumed the pigeons were simply elsewhere. Pressure on the nesting grounds and the market hunting of large numbers during migration led to their extinction.

While the early naturalists were observing, collecting and painting the birds of the state, they also noted the abundance and habits of the larger mammals, particularly those which came into conflict with the early settlers. As these settlers homesteaded their way across the state, moving up the river valleys from the coastal flatlands into the wild lands of the Piedmont and the Mountains, they carried their livestock, houses, cattle, pigs, sheep and chickens, with them. These herds and flocks received immediate and devastating attention from large carnivores, the wolves and the cougars. At the same time, the settlers, hungry for protein and reluctant to reduce their invaluable breeding stock for meat, looked to wild "cattle" as a source of readily obtainable meat and hides.

The elk and the buffalo were present in the Mountains and Piedmont of the state until around 1750. Both species were at the edge of their respective ranges here, the elk being common to the north and the buffalo to the west. Both were hunted hard for their meat. The elk was gone by 1750 and the last buffalo around 1760. At the same time, the far more numerous white-tailed deer were rapidly decimated until by the late 1800's, deer were found only in the most remote wildernesses in the mountains and the great swamps of a few coastal counties (deer have since returned to abundance in North Carolina through modern game management).

As their food supply decreased, the large carnivores which fed upon these large herds of native game turned more and more to the settler's livestock.

In 1711, John Lawson, in his *History of North Carolina*, remarked that wolves "go in great Droves by night" but it was the cougar or mountain lion, rather than the wolf, which he called "the greatest Enemy to the Planter of any Varmine in Carolina." Wolves hung on in the mountains of the state until around 1887 when the last band was hunted down and killed for committing depredations against livestock. Cougars disappeared by the late 1800's, but there is evidence that a few may be returning.

The last animal known to be extirpated in the state was the beaver. Mercilessly hunted for its rich fur since 1683, when King Charles II decreed the compulsory use of its fur in the manufacture of hats, this extremely abundant rodent rapidly disappeared from the eastern slope of the continent. The last native beavers were taken in 1897 when four specimens were sent to the State Museum from Danbury in Stokes County.

The beaver was absent from our fauna until the 1930's, when the first of a number of reintroductions was made with beaver from Pennsylvania and Alabama. The beaver is now common in many areas of the state and is fast reoccupying much of its former range.

It is hoped that with the recent attention focused on threatened and endangered species, there will come full recognition that all wildlife species play a vital role in the maintenance of a healthy and balanced environment. We have the opportunity to apply the same methods to our endangered species that resulted in the return of the white-tailed deer and beaver. ◆

John Funderburg is director of the State Museum of Natural History. He has been a key figure in the development of the rare and endangered species program in our State. David Lee is curator of Ornithology and Mammalogy.

These species of wildlife once lived in North Carolina. Most no longer live here, and some are extinct.

Passenger Pigeon

Market hunting contributed to the extinction of the passenger pigeon. Huge flocks once migrated through the Mountains and Piedmont, but the last flock was recorded in 1894.

Wolf

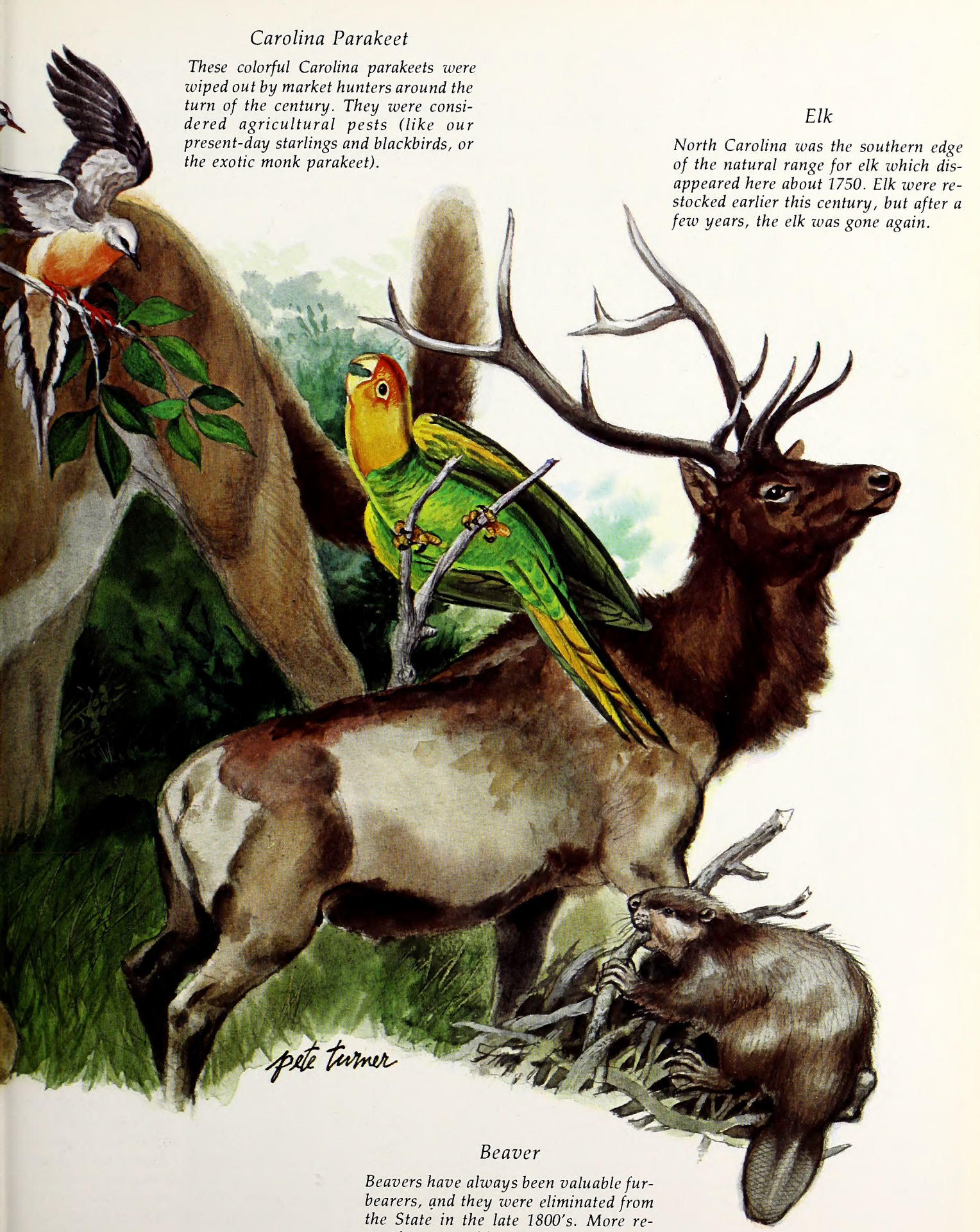
The last band of wolves was wiped out in the mountains of North Carolina around 1887. Wolves were then considered undesirable because they preyed on livestock brought in by the settlers.

Buffalo

Buffalo (and elk) were sought for their meat and hides, and the last buffalos were wiped out about 1760 in North Carolina. The Mountains and Piedmont represented the eastern edge of their former range.

Cougar

When the forests were timbered and the deer herds dropped, the cougar began to disappear. By the late 1800's, the cougar was gone, but in recent years, the restoration of habitat and the increase in deer may be bringing these large cats back.



Carolina Parakeet

These colorful Carolina parakeets were wiped out by market hunters around the turn of the century. They were considered agricultural pests (like our present-day starlings and blackbirds, or the exotic monk parakeet).

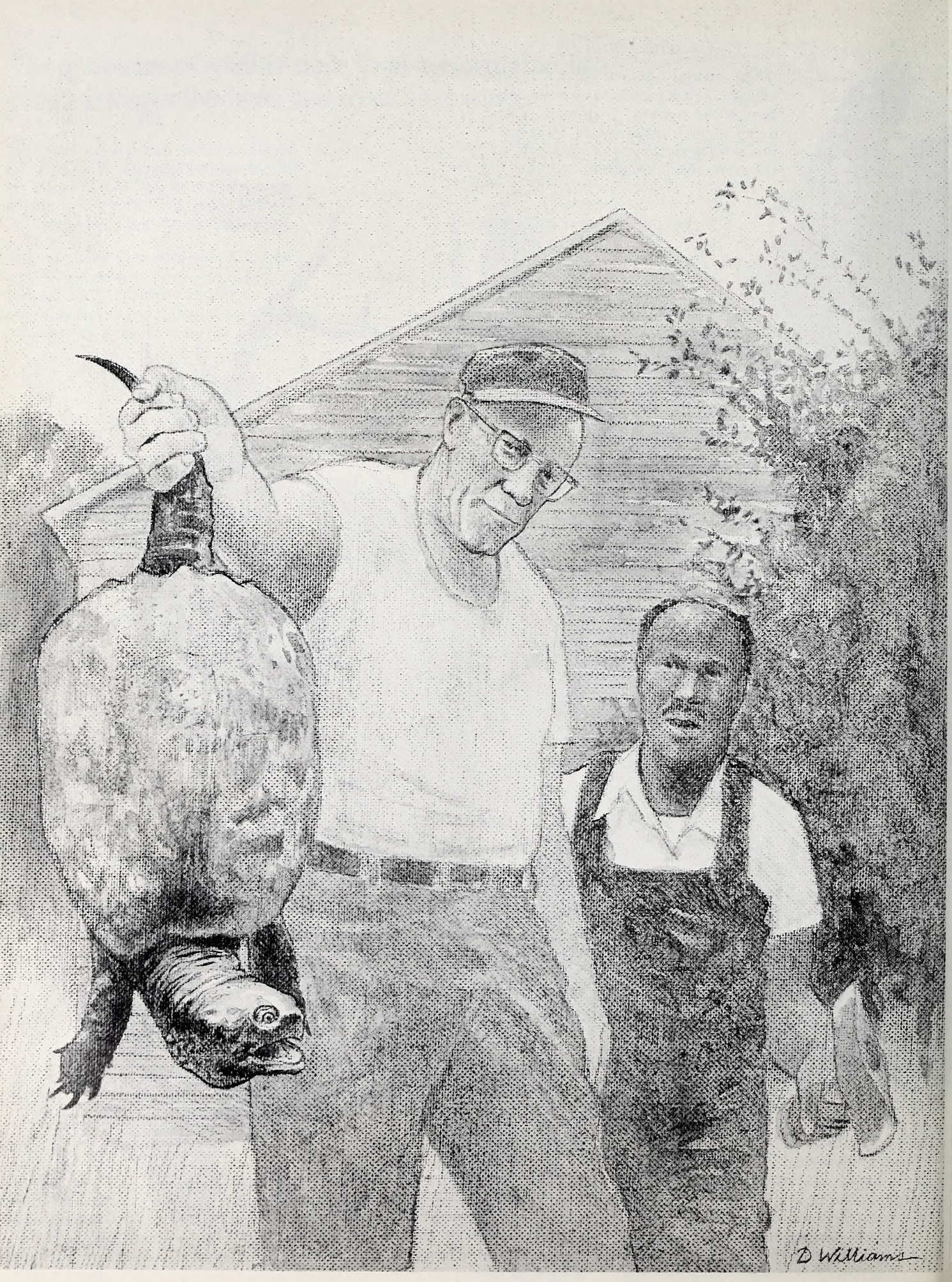
Elk

North Carolina was the southern edge of the natural range for elk which disappeared here about 1750. Elk were restocked earlier this century, but after a few years, the elk was gone again.

Beaver

Beavers have always been valuable furbearers, and they were eliminated from the State in the late 1800's. More recently, restocking and management have returned the beaver to widespread abundance here.

Pete Turner/Ferree Studio


D Williams

By Paul Koepke

Snapping turtles are brutally amorous, incredibly ornery holdovers from the Pleistocene Age. They are also quite delicious.

Willie And Me And The Two-Moon "Turkles"

"You want to hold or chop?"

"I chop 'im."

I passed the axe to Willie and turned to the garbage can that served as a temporary holding pen for the snapper. The turtle was a big one, a 25 pounder, that Willie had hooked while fishing in my pond and managed to play until I came galumphing up with the dip net and heaved it ashore. I had hoped that he would have taken it off in the topless carton I offered but he assured me, with wide-eyed solemnity, that he was not taking *that* to his bosom. Since there was nothing else to carry it in alive, it was obvious that the beheading would have to take place on the premises and that I was to be master of ceremonies.

The turtle was on its hind legs, leaning against the side of the can and glaring at me with baleful yellow eyes. Displeased with what it saw, it opened its powerful, toothless jaws and hissed. Clearly, it had the same Sam Smallish, I-hate-you-one-and-all-damn-your-eyes disposition as the rest of its species. I eased the can over on its side, slid the turtle to the ground, and grasped it firmly by the tail. As I lifted it, the head snaked out, hoping for a whack at my brisket, but as soon as the front of the plastron touched the surface of the chopping block it was quickly withdrawn and the waiting began. I maintained a firm grip on the tail, keeping the turtle's rear slightly elevated, until its head emerged again to take stock of the situation, extending further and further. Then the axe blade flashed with one clear, clean stroke from Willie and the deed was done.

Willie went on his way rejoicing with visions of sweet, tender turtle fried in egg and cornmeal dancing in his head, but I did not envy him the hot, messy afternoon which lay ahead. He will need a cauldron of scalding water, a short, sharp knife with plenty of backbone, and a lot of elbow grease before this behemoth winds up in the pan.

A brief immersion in the hot water, using the tail as a handle, will suffice to soften the skin and claws so that they may be readily removed, but then the real work begins. The turtle will be placed on its back and steadied with blocks or wedges firmly affixed to the table surface to eliminate any rocking or sliding caused by the rounded carapace. The plastron will then be loosened by severing with the tip of the knife blade the cartilaginous material which binds the plaston to the carapace. With the plastron retained as a movable but still useful pressure point, the knife will then be inserted along the interior surface of the carapace to loosen the meat from the shell, particularly at the points where the heavy leg muscles are attached. With this accomplished, the plastron will then be removed, the viscera extracted, and the edible remainder cut into sizes suitable for frying. Also, since Willie's turtle is a big one, it will be necessary to make filets of the neck and leg meat which will otherwise be too thick to fry properly.

Good luck to Willie and his turtle dressing. Meanwhile I have the severed head to deal with. There are many old wives' tales which have long since been discredited, but when these worthy crones advised not to pick up a newly severed snapper head, they were not just mumbling in their gruel. The things can bite. Hard. I found a stout twig and rapped the snout. Nothing. Another rap. No response. The third rap did it. The jaws had the twig in a death grip and I tossed them both into a briar patch for the ultimate delectation of whatever was interested. I never cease to marvel and, as often as I've done it, this recurring ritual never fails to bring to mind the time in my high school biology lab when a snapping turtle's heart lay beating hour after hour in a saline solution while, in an adjacent bubbling beaker, the same turtle's flesh was being loosened from its skeleton. Such is the tenacious grip these creatures have on life.

Turtles are plentiful in and around Two-Moon Pond: mud turtles, box turtles, cooters, pond sliders, the smelly little stinkpots, and the spotted turtles that my Ocracoke friends call "highland hicketies." But by far the most prominent are those tough, formidable holdovers from the Pleistocene like the one Willie and I had just dispatched.

Chelydra serpentina is a pretty fancy name for a grim old U-boat of a beast that spends its winters in some muddy burrow and the warmer seasons lying in wait on the pond bottom or cruising below the surface seeking anything those merciless jaws can crunch. But having little Latin and less Greek, it remains unperturbed by polysyllabic niceties and continues its ceaseless predatory rounds.

This year, after a particularly

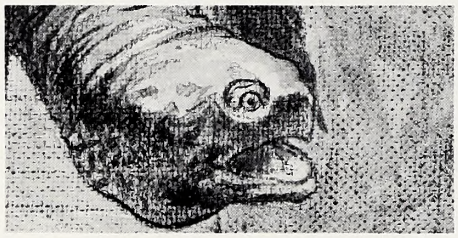
illustrated by David Williams

severe winter, I saw a snapper's conning tower rise for the first time on a blustery first of March. It apparently liked what it saw and, with plenty of food available, it appeared more and more frequently as the weather warmed, and it was soon joined by others.

The snapper's tastes are catholic, to say the least. Newts, fish, crayfish, snakes, muskrats, smaller members of its own species, anything, in short, that lives and moves in the pond of a size worth the trouble is considered fair game. Fishermen must look sharp to their stringers, particularly if any fish they catch are bleeding, and waterfowl are in great danger of being seized from below, never to rise again. This spring, for example, a female red-breasted merganser disappeared below the surface with flaps of protest before our eyes when we reached the spot, a subaqueous old meat-grinder of a snapping turtle was already tearing it to shreds. But despite their fabled voracity, their depredations have had only a minor impact on our pond life. We keep no domestic waterfowl and I feel certain that they are no more of a threat to the fish population than the kingfishers, herons, and ospreys who are regular visitors. And since they are a definite asset where muskrat control is concerned, I bid them Godspeed, and, unless inadvertently hooked by Willie, allow them to cruise unvexed.

With the coming of April and the warming of the water, the snappers are moved to participate in what passes with them for the process of reproduction. The encounter usually takes place in the northeast quadrant of the pond and always on the surface. A thrashing tumult in the water is the signal that an amatory engagement is underway and year after year I play the *voyeur*, fascinated by what seems to be one of the most brutal copulative procedures in nature.

It is clear at the outset that neither of the pair can stand the sight of the other. The male is the aggressor who will not be denied while the female is equally determined that she will see him sliced to ribbons before she will submit. And so they face off like two Civil War rams, maneuvering slowly for an advantage, edging into striking position so that their sharp, hooked beaks can be brought into play. After 45 minutes or an hour of this cut-and-slash, the raw, pink flesh of their gashed heads and necks is plainly visible and it is only then that the male finds the opportunity he seeks. A flattish plastron fits poorly on a rounded carapace, however, and soon they are plastron to plastron, locked in a love-hate embrace which sets them slowly barrel-rolling until their union is consummated. The rolling procedure is quite necessary, as it turns out, since, due to the overhang of the carapace and the leeway afforded by the plastron, only the bottom turtle, upside down, can get its head out of the water to breathe.



When at last they part, the impregnated female swims slowly off to the shallow, muddy end of the pond while the male, his stint in the lists of love complete, lies puffing and wheezing on the surface until he gets his wind back and can resume his interminable search for something else to snap at.

A Hindu mystic was once asked about his concept of the earth and he replied that the earth was an island floating on water in a huge bowl resting on the back of an enormous elephant which was supported by a colossal turtle. When asked what held the turtle up he indicated that it rested on yet another even greater turtle. When pressed further he finally replied, "Let's face it; there's always another turtle." And so it is at Two-Moon Pond. Catch them as we will, there is a seemingly endless supply of snappers, for there are ten ponds of an acre or more within a half-mile of ours and, when the wanderlust is on them, they may well leave the old homestead and move off to more congenial waters. On a number of occasions, by day or night, I have come upon them, lumbering across the lawn like miniature Sherman tanks and headed for my pond. One moonlit night, in fact, I went to investigate a hitherto unnoticed hump in the lawn near the water's edge and found myself standing in the immediate rear of a large snapper. As I bent over for a closer look it suddenly wheeled 180 degrees with remarkable agility for a creature so cumbersome and made for the protection of the water. I was in the way, of course, but not for long. I bounded into the air like a springbok and when I landed, the turtle had vanished into the dark pond. From that time forth, I did my nighttime hummock checking from a respectful distance with a flashlight.

Perhaps the greatest problem in playing host to these big, surly brutes is that occasionally one will swim too close to the vertical run-off pipe during overflow and find itself firmly pasted in place by suction. The protective shield around the mouth of the pipe has long since turned to ferrous oxide and only a stub of the cedar post which once supported it remains above water. As a result, whenever a snapper gets hung up it must be removed, either manually from a boat or by trying to snag a flange of its shell with a large Hopkins lure and a surf rod from the shore. Manual removal from a boat is not bad if the turtle is in head first and half strangled, but if it has made contact plastron down, it is usually in a towering rage and firmly stuck. To get it free without benefit of a stable platform and adequate leverage is dangerous and almost impossible. I therefore prefer to cast 20 feet with the treble-hooked lure until a purchase is secured and heave. The turtle usually comes loose with a mighty slurp and the overflow continues. As for the Hopkins lure, that always winds up somewhere in the big winged elm immediately behind me. I lose a lot of Hopkins lures that way.

And so the wheeling seasons come and go, and in and around our little watery world the snappers lurk in some secluded hideaways or slip effortlessly like gray-green shadows through the dark water, pausing now and then to up snorkel without a ripple and as quietly disappear. But inevitably the day will come when there will be a cry of "Big turkle!" from Willie and it's the dip net detail once again for me. ◆

Paul Koepke is a Durham resident, Professor of Music Theory at N.C. Central University, and describes himself as an "amateur naturalist." He is a graduate of the University of Iowa at Iowa City.

Condominiums For Fish

Worn out tires are making good homes for fish; that means good fishing for you.

By Larry Birchfield and Jim Dean

One of the oldest of all cartoon jokes shows a fisherman reeling in an old water-filled boot or an automobile tire. It's not exactly a knee-slapper, but some recent developments in fish management have given the old joke a touch of irony.

What would you say, for example, if you were told that fishermen are now throwing car and truck tires into the water? It's true. It seems that fisheries biologists have learned that, under certain conditions, worn out automobiles and truck tires make ideal homes for fish.

Using old tires to attract fish is not simply a matter of tossing out a few here and there in a lake. The reason is that fish seem to prefer high-rise apartments or condominiums instead of scattered housing developments. Put more simply, you've got to concentrate the tires to get the best results.

Building a fish condominium out of tires — an artificial tire reef — can improve fishing in a wide variety of waters. Tire reefs have been successfully used in salt water to attract game fish, and they've also proven highly effective in fresh water — not only in large lakes, but also in ponds.

In fresh water, tire reefs which are properly prepared and placed will attract a wide variety of fish. Crappies are particularly fond of "vulcanized" housing, but so are largemouth bass and sunfish. Even catfish and striped bass will hang around tire reefs.

Such artificial reefs are most effective in lakes or ponds where there is little natural cover for fish to hide.

Jim Dean

Jim Dean

Plastic worms are among the most effective lures to use around a reef made with old tires, and the "Texas-style" rig (right) is one of the most popular.

This is particularly true of large reservoirs because when such reservoirs are built, it is common practice to clear-cut the timber out of the flood pool. This is done partly for safety reasons to reduce boating hazards. Even in old lakes (where the timber was not cut), flooded stumps and logs are likely to rot away over the years. On lakes where electrical power is to be produced, the Federal Power Commission actually requires initial clear-cutting, particularly in shallow water areas.

The result in each case is often a lack of suitable natural cover to attract fish. By placing tire reefs, and marking them with buoys so that fishermen can find them, it's possible to provide good fishing spots where none existed before.

It's also worth pointing out that

This massive tire reef was placed in Lake Gaston as part of a cooperative venture between the N.C. Wildlife Resources Commission and local groups. The tires were lashed together (below), then towed on a barge to a spot where the water was about 25 feet deep (right, bottom). The bundles of tires were then dumped over and the spot marked with a buoy (right).

Larry Birchf

such artificial reefs make use of materials which might otherwise be wasted. There are an estimated 20 million tires discarded in the United States each year. Worn out tires are easy to handle, don't deteriorate or cause pollution and are readily available.

One of the first large-scale artificial tire reefs in this state was recently installed in Lake Gaston as a community action project under the direction and supervision of the N.C. Wildlife Resources Commission. Most of the labor and materials were donated. The tires came free from a Rocky Mount business, and members of the Rocky Mount Power Squadron helped drill holes in the tires so that they would sink. The tires were then tied together and loaded onto a barge where they were taken to the reef site about half a mile south of the Eaton's Ferry Bridge, and sunk in 25 feet of water. Over 350 scrap truck tires were used in the reef. Plans are to construct more of these reefs throughout the state in future years.

Owners of private lakes and ponds may wish to try a couple of tire reefs. On smaller bodies of water, you needn't use so many tires. Indeed, reefs using only half a dozen or so tires tied together would be helpful in small ponds.

Where you locate a reef can be important. If you put it in water too deep, there may not be enough oxygen at the bottom to support fish life during certain parts of the year. On the other hand, placing an artificial reef in two cr three feet of water would be largely a waste of time.

The best solution is to plan to have several reefs, and place them at varying depths. Good spots would be in depths of eight to 20 feet of water near a deeper drop-off. Crappies and bass will often gather around any available cover in such a spot. Fish like the safety of the nearby deeper water. The edges of old creek channels, drop-offs near the dam, old road beds, submerged "islands," and other similar types of structure are good locations for tire reefs, especially if there are not already stumps, tree laps and logs in the area.

Once you've found an artificial tire reef in public water, or placed one in your private pond or lake, you're ready to catch fish. It doesn't take long for the fish to begin using them.

For crappies, by far the most effective technique is to use live bait, par-

rry Birchfield

rry Birchfield

ticularly small minnows. In most cases, you want to dangle your minnow as close as possible to the tires, but sometimes schools of crappies will hang in open water above the tire reef. If all else fails, try flailing the water with your cane pole. You may think that such a ruckus would scare the fish, but it often seems to attract crappies.

For bluegills and shellcrackers, try live crickets, catalpa worms, or redworms instead of minnows. Also, be as quiet as possible. These fish don't seem to be attracted to noise. Small artifical lures, like Beetlespins, will work fine for crappies, bream and to a lesser extent, shellcrackers.

Bass also like tire reefs, but again you've got to be quiet. If you use live bait, anchor to one side of the reef, and use a spinning or casting rod with a float to cast a large minnow to the right place.

Perhaps the favorite artificial lure for bass on a tire reef — or any other kind of deep structure — is a weighted plastic worm. Plastic worms in the six to nine-inch class seem to work best. Color is not always critical, but purple, black and blue are usually productive. Use a sliding worm sinker on the line ahead of the hook (5/0 is a good all-round hook size), then thread the head of the worm onto the hook and bury the point of the hook into the worm so it won't hang up.

Casting tackle with 15 to 20-pound test monofilament is perhaps the best choice for this kind of "worm" fishing. Anchor the boat quietly away from the tire reef and cast your worm beyond it. Then reel the worm slowly back across the tires, twitching it from time to time. When you feel a bass take the worm, don't strike immediately. Instead, quickly give the fish some slack line and count to three. Reel up the slack and strike hard. Then hang on.

After you've landed a cooler full of fat crappie and a hefty largemouth or two from one of these fish apartments, you may be tempted to strip the radials off the family buggy and throw 'em in the lake.

Larry Birchfield was formerly employed as a district fisheries biologist for the Division of Inland Fisheries, and now works for Carolina Power and Light Company. Jim Dean is associate editor of this magazine.

Can Your Boat Measure Up?

State and private organizations actively promote boating safety. Some even offer free boat checks.

By Mark Taylor

"I'd like to teach my kid to handle a boat, but I just don't have the time. I wonder where he could learn to handle a boat safely.

"I'd like to do some cruising on the Intracoastal Waterway, but I don't know what I'd be getting myself into. First, I'd like to learn a little bit about boat handling before I make the plunge and think about buying a bigger boat. But I don't know where to get the information."

The answers to the above questions are readily available. A wealth of information is here in North Carolina on various aspects of safe boating for both young people and adults. Let's take the questions one at a time.

If you want to teach your youngster how to handle a boat, or at least, to learn a little bit about safety on the water, there are two main sources dealing specifically with this information. The Red Cross and the N.C. Wildlife Resources Commission's Divison of Boating both conduct courses on safe boating aimed at young people.

The N.C. Wildlife Resources Commission offers a course on safe boating through the public and private school systems in North Carolina.

"When we originally set up the course, we started by determining what was the cause of most boating accidents," said Ed Jenkins, boating safety coordinator for the N.C. Wildlife Resources Commission. "We found that regardless of the cause of the accident, there was one trait most accident participants had in common. They felt that nothing could go wrong out on the water. So we're trying to reach the kids early, before their attitudes have formed, and we try to show them that they need to be careful on the water. If they have a safe attitude, they're much less liable to run into trouble later."

The program run by the Commission is given to students in the sixth or seventh grades. The core of the program is a booklet given to each student on safe boating. With the aid of their teacher, students read the booklet and answer the questions at the end of each chapter. A slide quiz is also given along with the booklet. At the end of the course, students are allowed to keep their text.

The course doesn't emphasize the nuts-and-bolts aspects of boating, but teaches safety in general.

"These kids are too young to learn much about boating in the technical sense," said Jenkins, "so we just try to teach them the basics of water safety. We also urge them to take other courses later on which cover the more technical aspects of boating. Our four boating safety education representatives also give water safety demonstrations to various schools as a follow-up to the course."

The Red Cross also offers boating and water safety courses to the general public for both young people and adults. A few of the topics they cover are canoeing, motorboating, sailing, general seamanship, and other items. Courses run the gamut from meeting in the evenings once a week to spending full weekend trips afield.

The U.S. Power Squadron and the U.S. Coast Guard Auxiliary also offer public boating safety courses aimed at adults.

One of the most comprehensive boating safety courses is offered by the U.S. Power Squadron. This is a large private organization of boat owners, and one of its goals is public boating education.

Navigation, handling a boat in a bad sea, rules of the road, trailering boats, and choosing a boat to meet your needs are just a few of the topics covered in the course. Although the course is free, participants must pay for the text and supplies. The course is taught by volunteer members of the local Power Squadron. The Power Squadron also offers advanced courses in boating topics to its members.

The U.S. Coast Guard Auxiliary also offers boating safety courses to the public. The Auxiliary is a civilian arm of the U.S. Coast Guard. In addition to offering boating safety courses, it also offers courtesy motorboat safety inspection, conducts patrol operations at boat races, and performs search and rescue missions.

The course offered by the Auxiliary contains 12 lessons and also covers all aspects of boating from marlinspike seamanship and navigation to the rules of the road. Membership in the Auxiliary is open to anyone who meets the qualifications. Advanced training is offered to members on such topics as first aid and communications.

With the wealth of free information available, citizens in any part of North Carolina should have no problem getting all the information they need on boating and seamanship. Participation in these courses will improve your seamanship, and getting to know experienced boaters will help you avoid some of the pitfalls when buying and learning to operate your first boat.

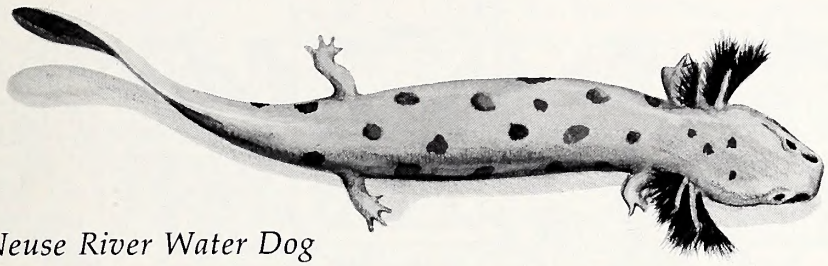
For more information on boating safety courses in your area, contact the following organizations:

North Carolina Wildlife Resources Commission
Division of Boating, Archdale Bldg.
512 N. Salisbury Street
Raleigh, North Carolina 27611

U.S. Power Squadron
District 27 Education Officer — John Rodgers
4910 Carmel Park Road
Charlotte, North Carolina 28211

U.S. Coast Guard Auxiliary
Director — 5th Coast Guard District
431 Crawford Street
Portsmouth, Virginia 23705

Red Cross — Contact your local chapter.



Neuse River Water Dog

illustration by Pam Dameron

Carolina Conservationist Program Gears Up For Third Year

"As of this July, the Carolina Conservationist Program will enter its third year of existence," commented Curtis Wooten, the N.C. Wildlife Resources Commission's coordinator for the program. "In those three years, the program has grown, and nearly $4,000 in contributions have gone into the program's coffers to be used for work with nongame and endangered wildlife."

The Carolina Conservationist Program started in 1976 to give non-consumptive users of wildlife a means to contribute funds to programs aiding nongame and endangered species of wildlife. The funds that come in from the contributions are used for research and education.

"Our biggest current project is probably the work on the threatened Neuse River water dog," commented Wooten. "We gave the N.C. State Museum of Natural History a $1,400 grant to continue research on this threatened species which is found only in the Tar and Neuse River basins of North Carolina."

The other aim of the program has been to educate the public on the need to save wildlife.

"Right now, we're producing a TV spot to publicize the program," Wooten said. "We're also putting together a slide show, with a sound track, detailing the needs of nongame and endangered wildlife in North Carolina. In addition to that, we've purchased film strips on endangered species in the United States, and printed posters and other publications on nongame wildlife in North Carolina."

All of the film strips, slide shows, posters, and literature will be available to the public at no cost. Schools and clubs are among the most enthusiastic supporters of the program thus far.

An advisory board consisting of representatives from several statewide conservation organizations was formed in 1972 to provide a means for greater public input into the program by nonconsumptive users of wildlife.

"In the future, we'd like to fund additional research projects, similar to what we're doing with the Neuse River water dog," said Wooten, "and it's very important that we continue to educate the public on the major threats to nongame and endangered wildlife.

"The Carolina Conservationist Program is very important, because it gives the nonsportsman a chance to help wildlife," added Wooten. "We've got to get the public more interested in preserving our wildlife resources, game and nongame species alike."

For more information on the Carolina Conservationist Program, write to the N.C. Wildlife Resources Commission, Carolina Conservationist Program, 512 N. Salisbury Street, Archdale Bldg., Raleigh, North Carolina 27611.

Boaters Save Bucks by Throttling Down

Boaters who wish to ease the petroleum shortage and save money on fuel consumption can do so by following a few simple steps, according to the Evinrude Company. The hints are as follows:

First, a boat engine should be tuned properly to hit its peak efficiency while using the least amount of fuel. If the engine is running rough, either tune it up yourself or take it to a dealer.

A boat should also be rigged so that it planes flat on the water. If the boat is porpoising, or squatting with the bow high out of the water, adjust the tilt of the engine to maintain an even keel. The motor should also be as far up out of the water as possible without losing power. The deeper the motor, the greater the drag. Taking these steps to maintain proper trim may increase fuel efficiency by 10 to 20 percent.

The boat's bottom should also be kept as clean as possible. The build-up of marine growth on a boat's bottom can increase drag by as much as 40 percent.

Once a boat is properly trimmed and tuned up, finding its optimum operating speed can reduce fuel consumption considerably. The last 20 percent of the throttle increases fuel consumption from 30 to 40 percent so avoid running the boat at full tilt. Find out what the most efficient operating range for the engine is and operate the boat at that speed. A tachometer is needed for this, since the range of the engine is measured in r.p.m.'s. Also, maintain steady speed; and if you plan to do much slow trolling, have a small auxiliary outboard for that purpose instead of using the larger engine.

For more information on reducing fuel consumption, write to the Evinrude Company, PO Box 663, Milwaukee, Wisconsin 53201.

Environmental Quality Index Down Again!

Personal Reflections On The Quality Of Life

"The trouble with most people is they're backwards."

"How's that again?" I asked. I hadn't been paying any attention to the stranger that took the plane seat next to me, I was too busy looking out the window at the glows from the cities in the Piedmont.

"I said people are backward," the young man continued. "Take where I'm from. The city is expanding, yet the surrounding towns want to retain their autonomy rather than become a part of the city. And they also refuse to let us put in reservoirs to supply the city with water. They're standing in the way of progress; what the city needs, it should be able to take. You can't live in the past."

For the next two hours as we passed over an almost unbroken stretch of metropolis running from Washington, D.C. to Boston, Massachusetts, we argued about preserving the environment, the right of people to live as they please, and what progress really is. As we disembarked I wish a Merry Christmas to the guy and his family in Providence, Rhode Island, and we went our separate ways.

I thought of him again when I picked up a publication from the National Wildlife Federation stating that the Environmental Quality Index for 1977 has declined again for the eighth consecutive year of the nine year annual survey.

The Environmental Quality Index measures the quality of life by rating seven environmental factors. The factors are soil, forests, living space, wildlife, minerals, air and water. Of these categories, only forests showed an improvement on a nation-wide basis, and air quality remained in a "no-change" category.

Personally, I don't think the outlook is the same for North Carolina as it is nationally. Let's take a look at some of these factors individually.

While water quality has declined nationally, mainly due to many municipalities dragging their feet in installing sewage treatment facilities, the situation in North Carolina and many other rural states has improved in some respects. Many of our rivers are cleaner now than they've been in years, and most industries have tried to meet the deadlines imposed by the Environmental Protection Agency. Yet rapid growth has caused water shortages in many areas, and there's increasing pressure to develop more reservoirs to meet our water needs. And in some areas of the Coastal Plains, heavy groundwater use from industrial and residential development is depleting the water table at an alarming rate.

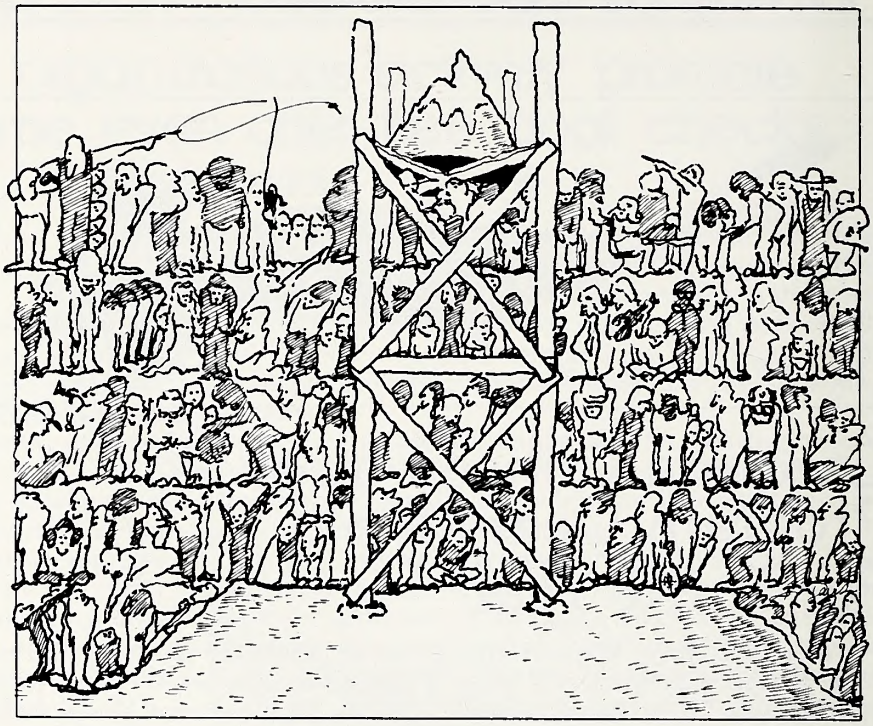


illustration by Steve Davis

Air quality is holding steady, but many authorities fear this may be short-lived. Proposals are being made to lower air quality standards, and many officials fear that a switch to coal as a power source will cause more air pollution problems in the future.

Soils also declined nationally. Erosion claimed four billion tons of topsoil last year, but the chief culprit in the decline is the continuing loss of prime farmland to urban development. The United States loses about a million acres of farmland annually this way. In North Carolina, the amount of land in agricultural use has remained fairly constant in recent years at about eight million acres, roughly 25 percent of the State's land area. Yet the pattern of agriculture has shifted from small subsistance farms to large-scale commercial operations aimed at getting the highest possible yield from every acre. And while the new "clean-farming" techniques are great for agricultural production, they leave very little food and cover for wildlife.

Forests were up slightly nationally, mostly due to the U.S. Forest Service's attempt to create more balanced multiple use plans for our National Forests. Once again, this is a difficult category to assess. Throughout the south the large timber companies are continuing to buy up huge acreages and plant them to fast-growing "super tree" softwood forests. From a timber production standpoint these pine plantations can't be beat, but they don't make very good habitat for some species of wildlife. And a growing demand for wood fiber in the future will call for more intensive forest management on private lands, much of it detrimental to some species of wildlife.

The minerals category has also declined nationally. Authorities predict that within 30 years, the world's supply of petroleum will be exhausted.

Wildlife is also down nationally, chiefly due to habitat loss. While many acres of wetlands have been

saved, another 600,000 acres were drained last year for various reasons. And while Congress appropriated $169 million to the U.S. Fish and Wildlife Service, it appropriated over five times that amount for dams and other public works projects which hurt many wildlife populations.

In North Carolina, the situation is much the same. The Commission is moving ahead and acquiring wildlife habitat through its game lands program, yet thousands of acres of prime wildlife habitat may shortly be innundated by large reservoir projects. And while the hunter-sponsored wild turkey restoration projects have brought these magnificent birds back from their record low of the 1930's, thousands of acres of former prime turkey habitat in the east are being planted into fast-growing pine plantations for pulpwood production.

In the end, the quality of our lives and our environment all boil down to one factor — population. In 1970, North Carolina had a population of about five million. When the last census was taken in 1976, the population stood at 5,469,000 and it has continued to grow since. In six short years, we've added the equivalent of three cities the size of Raleigh to the State and the demands on wildlife, water, and all of the other factors are beginning to tell. Like it or not, we're fast becoming part of that unbroken string of lights stretching from Washington to Boston. For in the next 10 years, an area about the size of the State of New Jersey will become urbanized on a nation-wide basis. Living space, nationally and in North Carolina, has declined.

There still may be a thin, silver lining in this dark cloud. If I could add another category to this index called "environmental awareness," offhand, I'd say it's up. No one can build a reservoir just for water skiing anymore; and despite the additional costs to the taxpayers, few people have cried that cleaning up our rivers has been a waste of money. In the future, we'll have to educate a lot of characters similar to the young man I met on the plane, who believes that the city has the right to gobble up all of our natural resources in the name of "progress." It'll be a tough row to hoe.

— Mark Taylor

April Enforcement Report

For the month of April, 1978, the North Carolina Wildlife Resources Commission checked a total of 59,458 hunters and fishermen and 15, 176 boaters.

Of the hunters and fishermen, 1,083 were prosecuted and 946 convictions were obtained. The total fines collected tallied $10,797 and the total costs collected were $21,291.

Of the boaters, 235 prosecutions were made and 210 convictions obtained. Total fines collected were $550 and total costs collected were $5,076.

Other prosecutions totaled 44 and convictions totaled 41. Total fines collected tallied $1,420 and total costs collected were $648.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

Will Coyote's Taste Adjust?

Western ranchers may have to tear their "Eat American Lamb — 10 Million Coyotes Can't Be Wrong" bumper stickers off the backs of their pickup trucks if a research project at the University of Wyoming pans out. For the University may have found salvation for stockmen who are suffering heavy sheep losses to coyotes in an unlikely source — tabasco sauce.

The University has received a $150,000 grant from the U.S. Department of Agriculture to develop a synthetic tabasco sauce to be sprayed on sheep to discourage coyote attacks. Tests have shown that coyotes don't like seasoned meat and will pursue other game if they discover that mutton is hot or bitter tasting. Robert McCollock, supervisor of the research project, predicts that the coyotes will continue to bite the sheep; but if they taste enough tabasco, they are expected to run to find water or rub their muzzles in the dirt to sooth the irritation.

We suppose it's just a matter of time until we turn on the TV set and see some joker telling us that coyotes dislike cheese-flavored tabasco sauce the best. But we figure that a critter that has thrived despite urbanization, traps, poison, and an all-out war to end its existence will probably learn to like tabasco sauce eventually. After all, 10 million barbecue lovers can't be wrong.

— Mark Taylor

Visual Distress Rule Proposed

The U.S. Coast Guard has proposed a regulation that will require recreational boats on coastal waters to carry visual distress signals.

Under the proposed rule, boats 16 feet and longer would have to have day and night distress signals at all times in coastal waters. Boats less than 16 feet in length and manually propelled craft such as canoes, inflatables, and row boats would be required to carry night visual distress signals only between sunset and sunrise.

A 120-day public comment period has begun and those wishing to express their opinions on the proposed regulation may send their comments to:

Commandant (G-CMC/81)
United States Coast Guard
Washington, D.C. 20590

Written comments should include the docket number (CGD-183) to identify the proposal. The proposal may be changed in light of comments received before final action is taken.

Unless numerous objections to the proposal are raised during the comment period which ends August 8, 1978, the rule can be expected to be in force prior to the 1979 boating season.

Coastal waters in North Carolina affected by the proposed regulation will include: Currituck Sound, Albemarle Sound, Roanoke Sound, Croatan Sound, Pamlico Sound, Core Sound, Bogue Sound, and portions of the Intracoastal Waterway, Alligator, Neuse, and Pamlico rivers.

— Ed Jenkins

Recycled Water, Too Good To Waste?

A program designed to improve the quality of the State's water resources is under study in Caswell County. If found to meet the Environmental Protection Agency's cost and environment criteria and if approved by the Wildlife Resources Commission and other screening agencies, the project would use the soils and vegetation on part of the Caswell Game Lands to provide the final treatment for Yanceyville's waste water. Benefits to the town would be a low-cost treatment system while benefits to the game lands would be improved growth of timber and wildlife foods.

Land application of waste water is a common practice in many parts of the world, but is seldom practiced in this country. The system has been under study here at various locations for many years, but only recently has there been much interest demonstrated in its use. Recent studies have resulted in improvements over processes used in other countries with the result that the EPA is now placing much greater emphasis on the use of the land application approach, and has made federal funds available to municipalities interested in working with the system.

The biggest stumbling block to land application of waste water in this country appears to be an unjustifiable prejudice towards sewage. Most people view the idea with considerable distaste, equating it to the Chinese custom of using "night soil" for fertilizing garden crops.

Lost somewhere in this train of thinking is the fact that wastes are first stored in a stabilization pond, where natural processes convert the waste to harmless and relatively odor-free substances that can be utilized by plants. Furthermore, the purification potential of vegetation, soil micro-organisms, and the soil itself is much greater than that of streams and rivers — not only in terms of available treatment area, but also in terms of variety and numbers of organisms that are involved in the purification process. Stabilization pond effluent processed through land application is practically "pure water" compared with that which is presently being piped from some treatment plants directly into our streams and rivers.

Research on land application technology has increased greatly in recent years. The thrust of these studies is to identify waste elements and the capacity of different types of soils and plants to recycle them into the environment in a safe manner. Research to date has fairly well dispelled concerns about contamination by various pathogenic organisms, and work is now being done to develop methods of converting toxic compounds to nontoxic forms, or to remove them from the waste water entirely. Studies are also being conducted to tailor land application systems to the topography and soils to prevent contamination of groundwater.

There is already a substantial amount of solid evidence at hand that forage and timber production can benefit greatly from land applicaton of waste water. There is also some evidence that browse and mast production might be increased.

Land application appears to be the least expensive means of waste water treatment for many small communities. All that is usually needed is a waste stabilization pond for settling solids and storing liquids. In such cases, solids do not have to be removed from the pond for additional treatment, thereby substantially reducing costs. Only the liquid part is sprayed on the land. The remaining sludge is a good low-grade fertilizer and makes an excellent soil conditioner.

The application area on the Caswell Game Lands would be a small site inside the wild turkey refuge. Since this is normally closed to hunting there would be no loss of public use. The only limitations on spray field design and layout would be those dictated by periodic timber cutting and local topography, soil, and vegetation. The spray field also could be placed in a location open to public hunting, and operating conflicts could be minimized during the hunting season by restricting time of spraying or limiting it to Sundays. Successful implementation of this project and widespread duplication elsewhere could lead to the savings of millions of dollars of taxpayers' money in funding waste treatment, as well as the utilization of a neglected resource.

– Frank Barick

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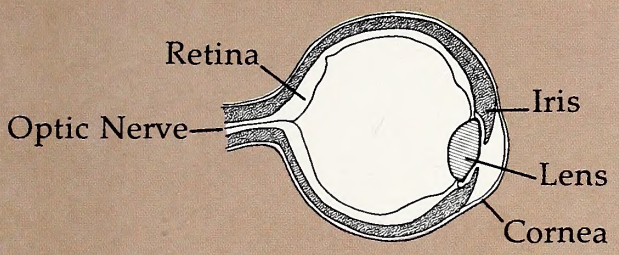
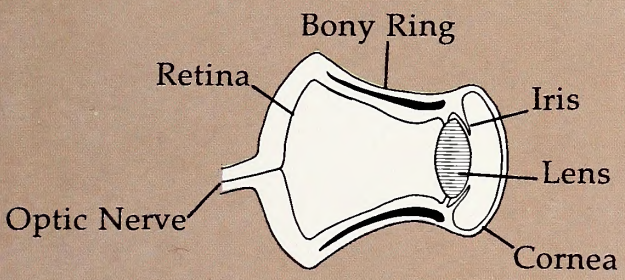
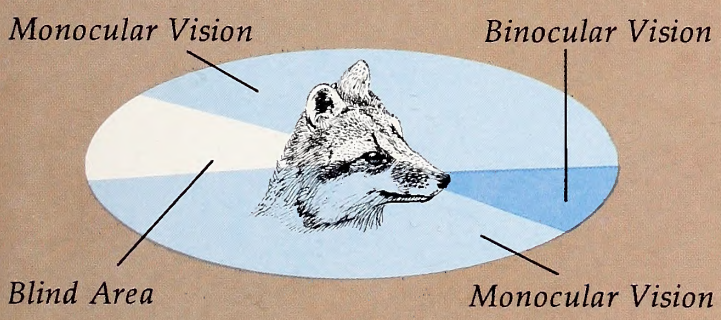
by Duane Raver

Nature's Windows On The World

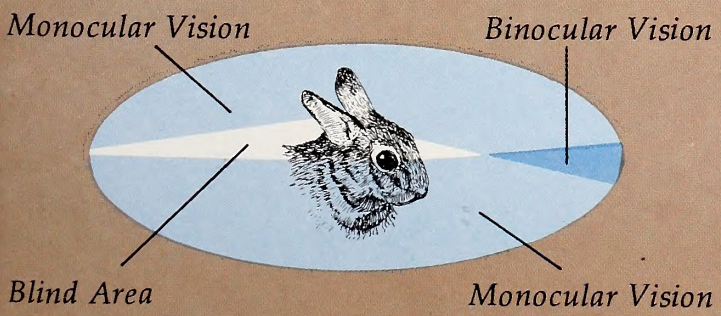




The top sketch shows some of the basic parts of a typical mammal eye in a very diagramatic way. The parts labeled are found in all mammalian eyes.
The owl eye represents a bird eye with great light-gathering qualities. The bony ring is an open-ended cylinder, less than an inch long.



The fields of vision of a typical "hunter" (above), like a fox, show slightly more restricted monocular vision areas (to the sides), a wider "blind" area (to the rear), and a larger monocular vision area (straight ahead), than the "hunted" creature like a rabbit (below). Man's blind area is even larger than that shown for the hunter.



Of nature's multitude of remarkable mechanisms, one of the most miraculous is the eye.

Animal eyes have many features and structures in common, yet there are several significant modifications and adaptations which make each animal eye distinctive. Basically, an eye works like a camera.

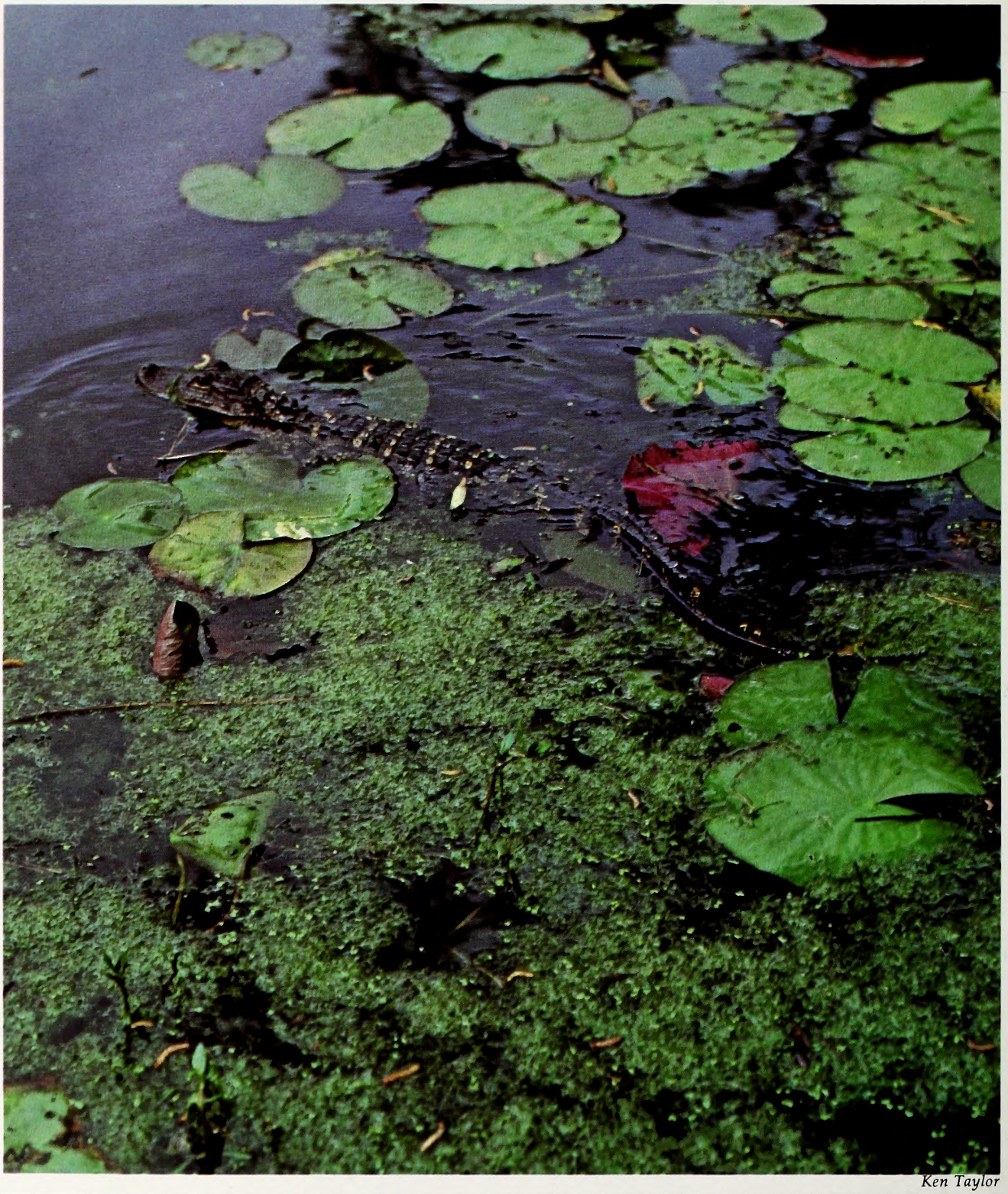
The image comes through a lens, modified by an iris and this image is then transferred to the brain by the optic nerve, where the impression is unscrambled, and we see. This general procedure is followed in all animal eyes; but some wild critters see better in the dark than others (cats, owls), some eyes are adapted for underwater sight (fish, water mammals), a few are constructed to pick up the least bit of movement but fairly close by (dragon fly and other insects) while some are sharp and telescopic for long distance sight (hawks and eagles). The position of eyes on the critter's head is important . . . perhaps even more important than the "sharpness" of the eyes themselves. Basically, the hunter (an owl, or fox, for example) has its eyes aimed or positioned toward the front, while the hunted (a rabbit, or mouse) has its eyes more on the side of the head. The fields of vision are shown on the accompanying diagram. Most animals have both monocular (vision from one eye) and binocular (vision from both eyes at once) sight. Binocular vision is more extensive for the hunter (the fox) than it is for the hunted (the rabbit).

The eye of the great horned owl and other night-hunting owls, is a marvel of light-gathering efficiency. Set in a bony ring or cylinder, the eye has a large opening to let in faint light, and more rods than normal in the retina, 10 times more sensitive to light than the human eye. This vision is likely restricted to "black and white," but the owl cares little at night.

Underwater, the world changes to an almost perpetual shadowy, dimly-lit existence, where vision beyond a few feet is seldom important. Thus the eye of the fish is structured for fairly close viewing with a lens that is practically stationary with little focusing ability . . . sort of like a camera with a fixed focus set at about three or four feet.

The fish's field of vision is wide, however, and little sneaks up on him, except perhaps from directly above and below. The argument as to whether fish are color-blind continues among the angling fraternity, but science has pretty well established that most fish indeed tell the difference between colors.

Eyes of some sort are important to just about every living thing. When sight is gone or diminished, the animal soon perishes unless another sense can be developed or adapted to sustain the creature. That's nature's way.



Ken Taylor

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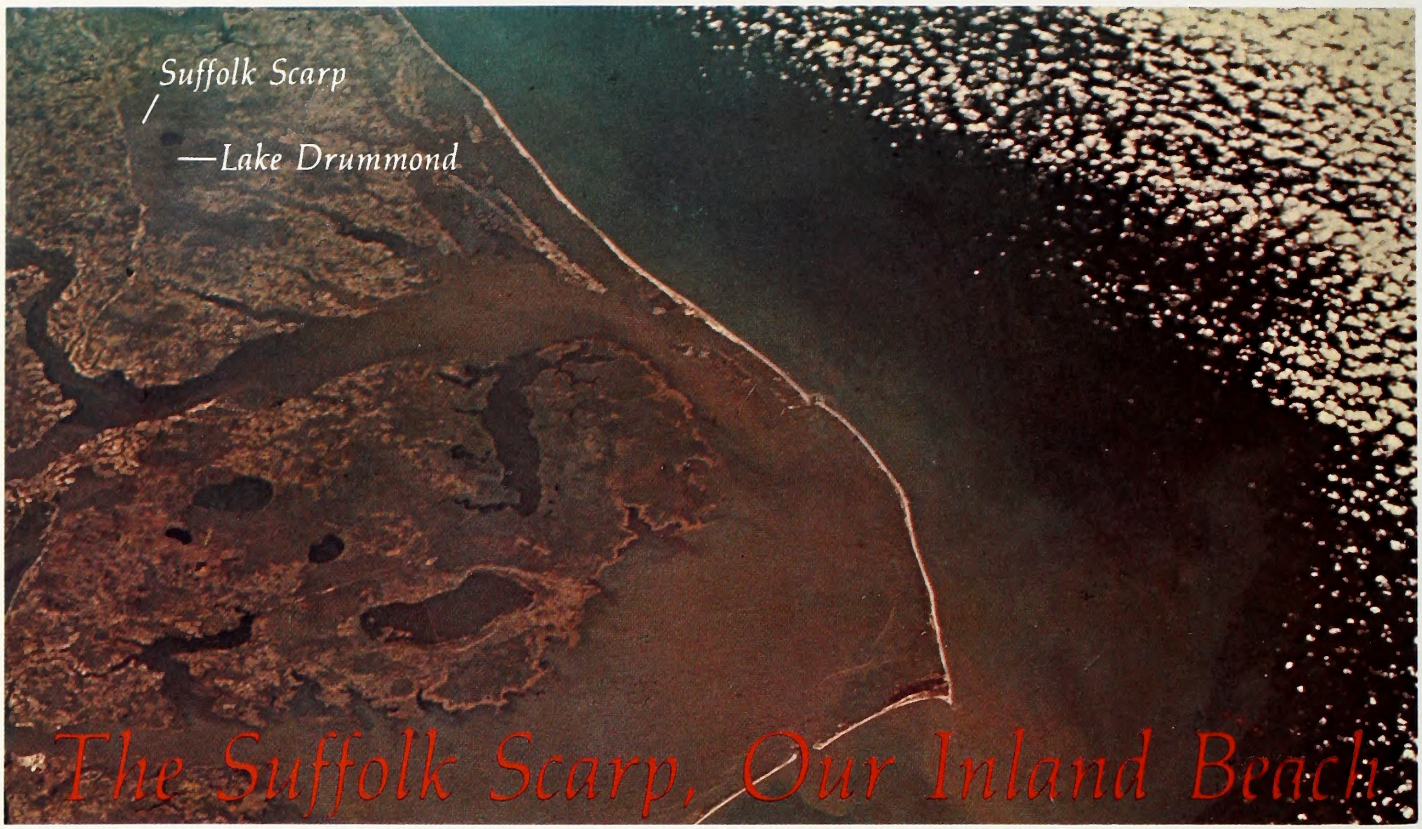
Our Natural Heritage

by Jim Dean



The Suffolk Scarp, Our Inland Beach

NASA

The Suffolk Scarp is an ancient beach formed over 50,000 years ago when glaciers melted and the sea level rose. You can see the Suffolk Scarp west of Lake Drummond in the upper left corner of this Apollo Nine photograph.

There are lots of people in eastern North Carolina who live at the beach and don't even know it. Maybe that's because the ocean hasn't lapped against the shore in at least 50,000 years.

The ancient beach, known as the Suffolk Scarp, is a sandy ridge thrown up by tides long ago. Actually, there are several of these old beaches or scarps in the Coastal Plain, but all are generally referred to as the Suffolk Scarp. They are plainly visible in high altitude photographs taken by U-2 aerial reconnaissance planes or from space. The most famous photograph is the Apollo Nine shot which shows eastern North Carolina from just west of Plymouth all the way east past the Outer Banks.

The Suffolk Scarp begins near Suffolk, Virginia, and runs in a southwesterly direction into North Carolina to near the mouth of the Chowan River.

South of Albemarle Sound, two parallel scarps — the Pinetown Scarp and Chapel Scarp — run south to the Pamlico River. Pinetown Scarp passes through Hinson, Hoke and Pinetown, and to the east, Chapel Scarp passes through Union Chapel and Acre.

South of the Pamlico River, the Arapahoe Scarp (also called Minnesott Ridge) turns slightly eastward and runs through Grantsboro and Arapahoe to the Neuse River. Across the Neuse, this scarp runs through North Harlowe to Bogue Sound near Morehead City. Another old surf line, Bogue Scarp, roughly parallels the western shore of Bogue Sound.

Even from the ground, the knowledgeable observer can spot these ridges, and in places, they are quite prominent. The Arapahoe Ridge, for example, is nearly 30 miles long between the Pamlico and Neuse estuaries and ranges from approximately one-half to one mile wide. It stands about 15 to 20 feet higher than the plain to the west.

Because of the prominence of the old dunes along the Arapahoe Ridge, this particular scarp is thought to have been a storm beach, which means it faced the open ocean. Other ridges are less distinct.

Those who might like to see the Arapahoe Scarp can easily do so by driving along N.C. 306 north of Grantsboro. Approximately eight miles of this stretch follow the crest of the scarp.

These old beaches or scarps were partly created as a result of the melting glaciers 50,000 to 70,000 years ago. Geologists point out that because the Coastal Plain is so low, even a relatively small change in the sea level could cause drastic changes.

For example, if all of the earth's present glaciers were to melt, it would raise the sea level 100 feet, and that would bring the beaches nearly to Raleigh. Undoubtedly, on a hot July and August weekend, there might be a sizable number of Piedmont residents who would vote for deglaciation, but you can readily understand why our coastal residents would be opposed. After all, that might put the Gulf Stream somewhere around Kinston.

WILDLIFE IN NORTH CAROLINA

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Back Cover *By Ken Taylor*
"Superfarms" in Eastern North Carolina have spread massive fields to the shores of Lake Phelps.

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"Carbine" Williams

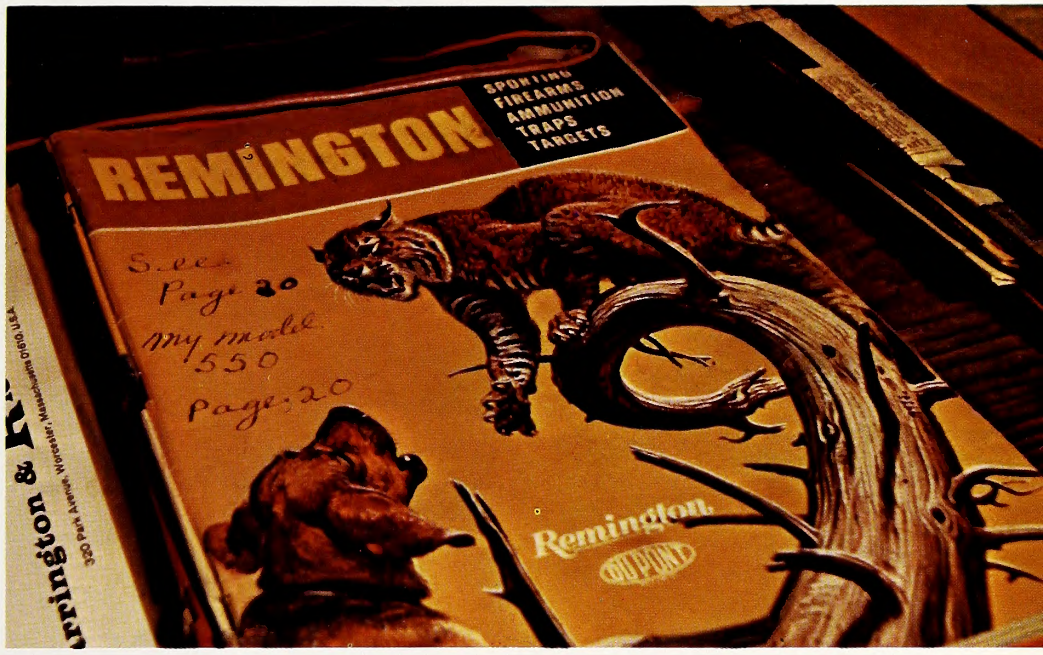
This Cumberland County native contributed major inventions in both sporting and military arms, including the MI Carbine. His shop has been moved to the N.C. Museum of History in Raleigh where it is the centerpiece of an impressive display.

THE INVENTIVE MIND OF David Marshall Williams touched the lives of many people, including thousands who may never even have heard of him. Many hunters, and even more military veterans, owe the man who later became known as "Carbine" a considerable debt — perhaps even their very lives.

Williams eventually accumulated over 50 patents for inventions and improvements in the field of firearm design, the most important undoubtedly being the development of the short stroke gas piston and the floating chamber, both of which were used on the M-1 carbine. From 1940 to 1945, over six million carbines of all models were manufactured for the U.S. Army, and this weapon gave American soldiers superior firepower during World War II and in Korea. Many nations still use the weapon, and it is also being produced commercially as a sporting arm.

Many hunters, target shooters, and trapshooters have used guns which have features designed by Williams. The Model 50 Winchester Autoloading shotgun was developed by Williams. It was considered an advanced and rather radical scattergun not only because of the steel tube, fiberglass wound barrel (which Williams did not design, and in fact disliked), but also because of the floating chamber which would accept various length shot shells and fire them with very little recoil.

Likewise, the Model 550 Remington .22 caliber rifle, a very popular sporting arm produced in the 1950's, was largely based on Williams' many patents. This rifle featured a tubular magazine and floating chamber which would interchangeably accept shot, long and long rifle .22 cartridges. It also had double spent shell extractors, another Williams' design.



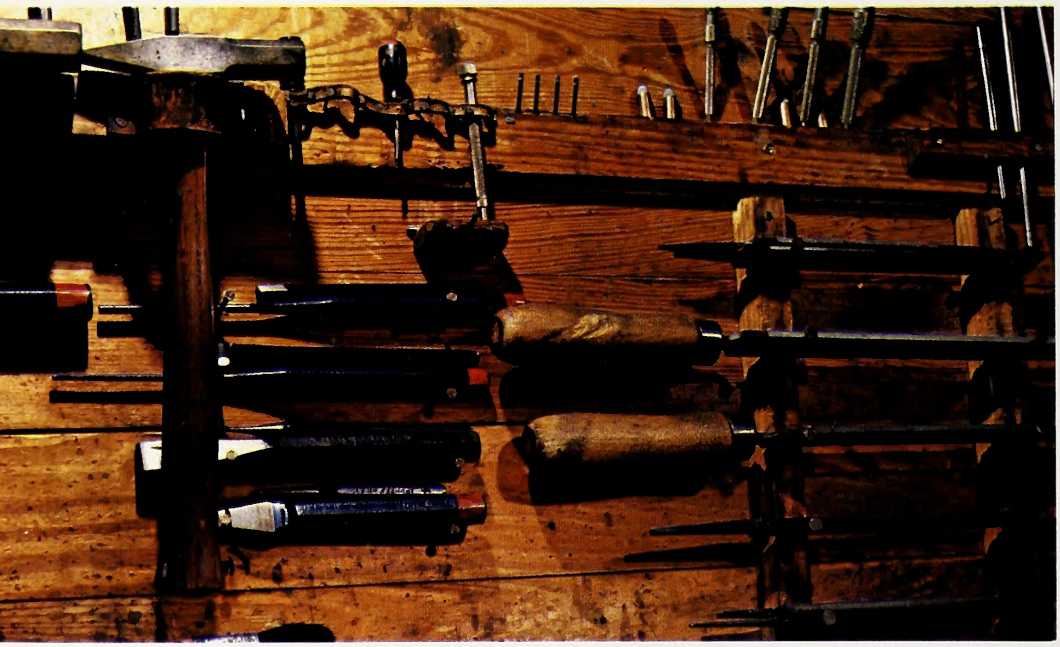
A large 1950's photograph of Carbine Williams can be seen through the window of his shop which has been moved to the Museum of History in Raleigh (left). Williams has marked the top magazine in this stack (above) to indicate that it contains information about the Model 550 Remington .22 caliber rifle which he designed.

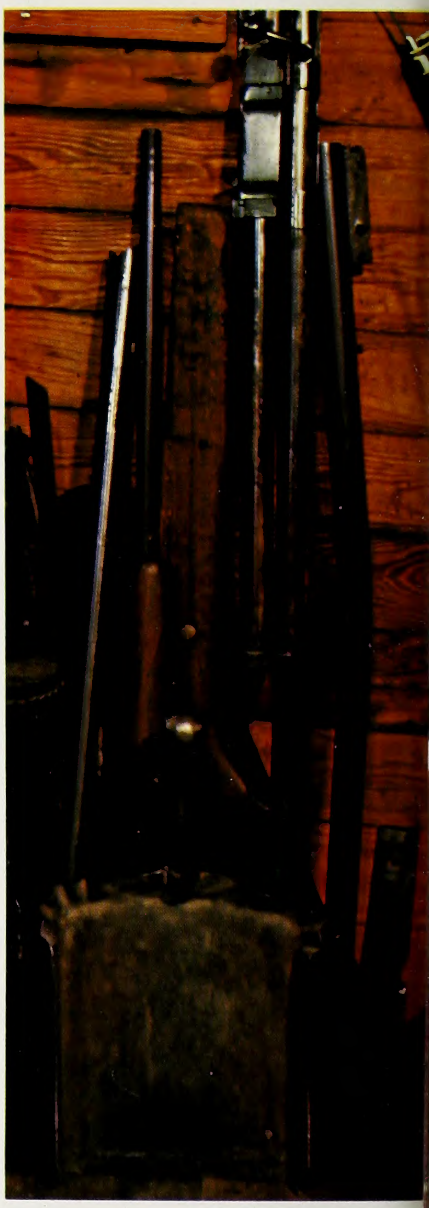
Likewise, the floating chamber was also used in the Colt .22 Service Model Ace, a pistol that duplicated the accuracy and feel of the Colt .45 Automatic.

Williams also invented trigger and sear assemblies and his set trigger design has been used on some of the more advanced target rifles. Among his many weapon inventions are rifle sights, safeties, stocks, slings, buttplates, cartridge and shell-feeding mechanisms, takedown systems, ejectors, extractors, receiver assemblies and cartridge deflectors.

by Jim Dean photographs by Ken Taylor

Williams made many of the tools which he used as a gunsmith, including the crosspeen hammers in the leather loops (below). The walls and corners of Williams' shop display items just as he left them, including assortments of old barrels, gunstocks, and tools (right).





He worked on new gas recoil systems, blow back, bolt action and even blow forward designs. He even worked on machine gun design, and constructed one which would fire 2,000 rounds a minute.

Williams was not only a prolific inventor; he was also an interesting and sometimes controversial figure who quite literally became a legend during his lifetime. Born in Godwin (near Fayetteville) on November 13, 1900, he was one of 11 sons of a locally prominent tobacco and cotton farmer. At age 10, Williams built his first pistol which featured a steel tube taped to a wooden frame. The primitive pistol used a match head to ignite black powder and fire either shot or ball.

When he was 17, Williams married Margaret Isabella Cook of Black River, and began working as a railroad section hand. He also began to make and sell untaxed whiskey — not a particularly unheard of business venture in 1917. Unfortunately, in 1921, a deputy sheriff was killed when six law officers raided the st which Williams helped operat Though always maintaining his i nocence in the shooting, Williams as owner of the moonshine operati — was charged with first degr murder which carried a mandato death sentence on conviction. Ho ever, his trial ended in a disagre ment, and on advice of his lawye Williams accepted the State's offer a lighter sentence of 30 years at ha labor in return for a plea of guilty second degree murder.

It was in 1923, during his seco year in prison, that his interest gun design was rekindled. Worki as a trusty in the blacksmith shop the Caldonia Prison Farm, he d veloped a rifle with a bree mechanism that would not jam rain, mud or sand. The revolutiona principles of the "short stroke p

One window display at the Museum (top, left) shows his Remington .22 rifle, the Colt .22 Ace pistol, and the Model 50 Winchester shotgun. At the bottom of the display is an M-1 Carbine, and that's General Douglas MacArthur with Williams in the photo directly above the carbine. Williams' entire shop is now part of the display, having been moved from Godwin (bottom, left).

ton" and the "floating chamber" followed shortly.

In 1929, because of his contributions as a designer, Williams was pardoned by Governor Angus MacLean. Williams then returned to Godwin and with the help of his brothers, built the machine shop that is now on display in the North Carolina Museum of History.

As new designs were patented, Williams' fame grew and at various times he worked for the Winchester, Remington and Colt gun companies. In the early 1950's, Williams' fame was assured when MGM produced a movie titled, "Carbine Williams," starring James Stewart.

Following his death, Williams' small machine shop was dismantled and moved from Godwin to the second floor of the Museum of History where it was reassembled and each tool and gun placed exactly as Williams left it. There are also displays of his early prototype weapons, including those he made in prison.

For those who would like to learn more about Williams, Ross E. Beard, Jr., has written a biography titled, "Carbine." Copies are available for $12.50 from the N.C. Museum of History Gift Shop, Archives and History State Library Building, 109 East Jones Street, Raleigh, N.C. 27611.

Jim Dean is associate editor of WILDLIFE IN NORTH CAROLINA.

Clean Sweep In The Coastal Plain

Huge farms are changing eastern North Carolina. What will this do to our wildlife and marine ecology?

by Mark Taylor

At the far edge of the horizon, you can barely make out a dim treeline. Below the horizon, stretching for miles on end, are newly cleared fields. Roads crisscross the vast expanse, and an occasional boil of dust pinpoints a pickup truck threading its way through the open ground. Everywhere there are tractors plowing, harrowing, spraying chemicals, raising dust, working the soil.

The fields aren't located in Kansas or Nebraska. They're right here in North Carolina. In Dare, Tyrrell, Washington, Hyde, and Beaufort counties, the patterns of land use have changed dramatically in the last 10 years. Land that was once in timber and small farms is now in large farms. There are corporate farms owned by trucking companies, John Hancock Insurance Company, a midwest meat company, and even Japanese and French corporations. Corporate farming has arrived in North Carolina.

Dennis Luszcz, a wildlife biologist for the N.C. Wildlife Resources Commission, has worked in these counties for the last three years. He is concerned about the impact the new farming operations are having on wildlife and on the land.

"The worst effect that big farms have on wildlife is the loss of habitat," said Luszcz. "The initial clearing of farmland is the most destructive of all their practices, and that's what wipes out most wildlife populations."

The process for converting forests and swampland to farmland is quite simple and radically different from the laborious methods used in the past. First, the forests are clearcut. Then giant bulldozers sweep through the area, pushing the slash into large windrows spaced a few hundred feet apart that run the length of the fields. After the bulldozers have swept the slash up into windrows, huge cleated rollers are

Corporate tractors plow the huge fields recently cleared in eastern North Carolina. The pleasing patterns bely a growing concern about the environmental impact of "superfarms."

"The only wildlife habitat left in many of these areas exists in the drainage ditches."

The fields on some of the big farms are so large that they are mind-boggling. One clearing on First Colony Farms is over 12 miles long and several miles wide. Although roads crisscross the vast expanse, you won't see a windrow of trees. Dust clouds are a common sight in these areas, and biologists are worried about siltation problems in Lake Phelps, which lies in the heart of the corporate farming area.

photography by Ken Taylor

hauled over the land to break up the roots and till the earth. Then tractors come in, first with large bog harrows to work the earth, then with smaller harrows to grade the area and work up a seedbed. Crops are often planted the same year that the land is cleared.

"Once the ground is swept clean on these farms, the wildlife habitat disappears," said Luszcz. "Every bit of ground cover is often removed. There will be good wildlife habitat in the slash windrows for awhile but that doesn't last long. The windrows are burned annually to make them smaller. After a few years, all that's left are small mounds of slash which are then trucked away. The only wildlife habitat left in many of these areas exists in the drainage ditches which are used by otters, other aquatic furbearers and an occasional wood duck."

The size of some of the clearings is hard to believe. Luszcz pointed out one clearing on First Colony Farms that is 12 miles long and several miles wide. The potential size of that clearing is much larger because the owners of several other large adjacent tracts are clearing their own acreage in the same way.

"First Colony has caught a lot of flack for what's happened down here because it was the first corporate farm and also the biggest," said Luszcz. "It's not entirely fair because a lot of smaller farmers are doing exactly the same thing to their land. When First Colony got underway, the technology and equipment needed to clear large plots of land economically wasn't available. They developed it, and now there are a bunch of land-clearing companies that specialize in this work. A lot of the little guys are jumping on the bandwagon and doing the same thing."

First Colony Farms runs the most intensive operation of any of the corporate farms. Tyson Foods, a midwestern company, runs a large hog operation on First Colony land. There are also large cattle feedlots on First Colony, and the hog and cattle feedlot operations are supported by large acreages of land planted in soybeans, corn and grain.

Another enterprise First Colony Farms is dabbling in is peat harvesting. Most of the soil on the farm is peat which is made up of decaying forest matter. First Colony is stripping the peat down to a depth of four or five feet, depending on how deep the deposits go. They are considering burning the dried peat to generate electricity or to create synthetic natural gas. According to Luszcz, after the peat has been mined, officials are considering putting a dike around the sites, pumping the water out of them and putting them into agricultural production.

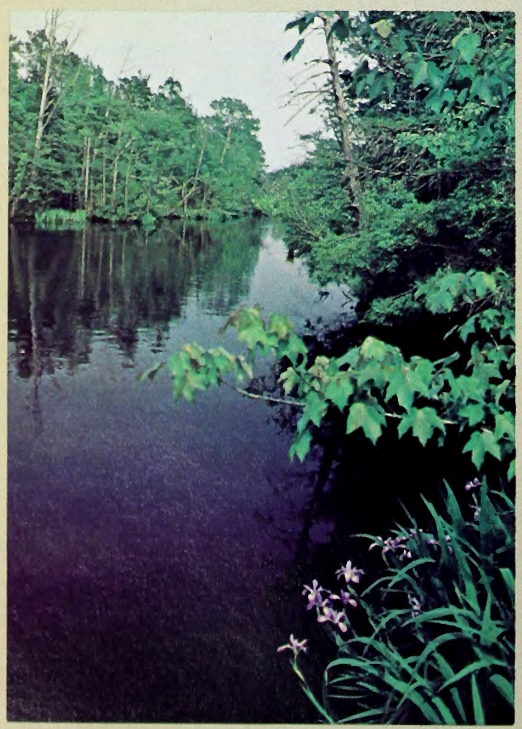
Of all the wildlife species found around the big farms, the black bear has suffered the most according to Luszcz. The original pocosin forests and swamps that covered the land were excellent bear habitat giving these shy animals the solitude they needed. These areas were impenetrable in some sections making them almost impossible to log before mechanized cutting operations were developed.

Deer populations have fluctuated depending on the area. On farms like First Colony, where huge expanses of land have been cleared and planted to crops, deer have suffered. On other farms, where windrows have been kept and the emphasis has been on grazing livestock and not on raising crops, deer populations have held their own.

"Along the edge of any field you have high deer populations due to the 'edge' effect," said Luszcz. "But the population is only high right

Fresh water, drained from the super farms, flows into the brackish sounds carrying herbicides, pesticides and chemical fertilizers.

This photograph (opposite page) tells the story of the big farms in a nutshell. In the foreground, initial land clearing is underway. The forest is clear-cut, using mechanized harvesting methods. It will be graded and put into agricultural production in the near future. The buildings are part of a feedlot operation where either cattle or hogs are raised. The surrounding land, stretching to the far horizon, is put into crops.



where the two areas meet. In farms where extensive clearing has left little edge, deer populations have fallen. There is nowhere near the amount of game of all species that would be present if the land were still in a patchwork pattern of small farms, woodlots, and forest; however, patchwork patterns and windrows are not as conducive to drainage and megafarming as large more open expanses."

A few species, including dove and quail, do well in the slash windrows, but the prosperity is short-lived. "After a few years, the windrows are gone, and then the dove, quail, and songbirds that used the windrows are out on the street," Luszcz explained.

The N.C. Wildlife Resources Commission has attempted to improve the wildlife habitat on big farms. Until recently, much of First Colony Farms was in the Commission's Game Lands program. The Commission also tried to stock the farms with pheasants taken from the Outer Banks. Biologists thought these birds might do well under the prairie-like conditions of the farm.

"The pheasant program failed for a number of reasons," Luszcz explained. "For starters, the soil on these farms lacks calcium and many other important minerals required by pheasants. The climate may also have been too hot for them."

About the only wildlife that really prospers from the big farming operations are ducks and other waterfowl, according to Luszcz.

"Waterfowl species use the big fields to pick grain and food," he said, "but even this has passed the point of diminishing returns. There are far more open fields down here than our waterfowl population can ever possibly use."

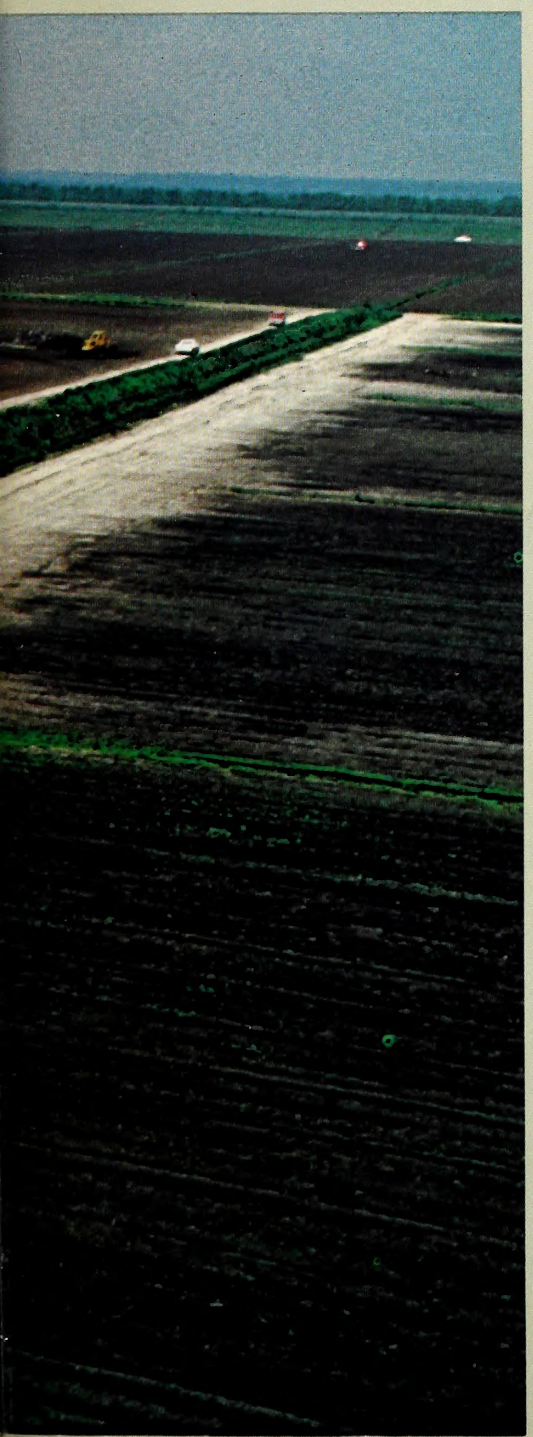
The effects of the big farming operations on wildlife aren't confined to the land. Drainage plays an integral part in the big farming systems and a standing joke among area farmers is that "If you took Hyde County and folded it in half, it would still be below sea level." Now that the means of draining these low-lying areas exist, all of this fresh water is being pumped into Pamlico Sound. Officials from the N.C. Division of Marine Fisheries are worried about the effect this is having on shellfish populations and other marine life.

"The large amounts of fresh water running into the sounds are hurting shellfish and shrimp populations," said Connell Purvis, a marine biologist for the N.C. Division of Marine Resources. "Not all of this water is coming from big farms; some is due to increased runoff from rivers entering the sounds, some comes from clearcuts, some from highway development and some from other sources. The big farms, however, aren't helping the situation any."

The declining salinity of the sound damages shrimp populations by keeping the young shrimp from the primary nursing grounds. Shrimp spawn at sea, and as spring approaches, the shrimp larvae work their way into the sounds. The richest feeding grounds are far up in the sounds where the water is shallow and there are extensive mud flats. The young shrimp can withstand a salinity count as low as 10 parts per thousand; and if any extra source of fresh water is entering these crucial areas, it often makes them unsuitable for shrimp populations. This forces the larval shrimp to feed in the deeper, saltier waters of the open sound where less food is available and where they suffer heavy losses to fish predation.

After a few years, the windrows are gone, and then the dove, quail and songbirds are out on the street."

Huge tractors are a common sight on the big farms. After an area has been cleared, bulldozers will break up the soil between the giant slash windrows. The dozers are followed by tractors, which use large harrows to work up a seedbed. Land is often put into agricultural production the same year it is cleared. The slash windrows offer some shelter to wildlife, but they are burned every year until they're gone.



Oysters are affected in much the same way. Although oysters are immobile, they can withstand short fresh water freshets by closing up their shell and sitting pat until the freshet passes over. But, if there's a prolonged influx of fresh water, which often happens when agricultural draining occurs near oyster beds, the beds in many of the protected and most productive areas of the sound will be destroyed.

"Over the course of the past 25 years, we can see how fresh water intrusion into the sound has hurt fisheries," said Purvis. "Twenty-five years ago, fishermen were making commercial catches of shrimp and oysters in the Belhaven area of the Pungo River. Now, the first commercial catches are being taken off Pamlico Point, which is in the open area of the sound, and is about 18 miles seaward of Belhaven. We recognize that agricultural drainage is legitimate activity and don't really expect anyone to stop it because of our fisheries; but if we're going to get maximum marine production out of the sounds, we've got to protect the salinity of the waters."

According to Purvis, there are ways to minimize the impact of fresh water drainage into the sounds. Drainage systems could be routed so that they drain into the open section of the sound, which has higher salinites and where there are no crucial feeding areas for oysters, shrimp, crabs, and some species of salt water fish. Purvis stresses that there is a need for comprehensive planning among all agencies involved so that agricultural draining can continue while protecting valuable shellfish areas and the livelihood of commercial fishermen.

Officials are also concerned about the amount of agricultural chemicals running into the sounds.

"In the three years I've worked in this area, I've never seen any of the big farms do any mechanical cultivation," said Luszcz. "They do everything with herbicides, pesticides and chemical fertilizers. All the water, which is full of chemicals, is drained off the fields and ends up in the sound. They sometimes can't get a permit to discharge this water directly into the sound so they often dump it out into the woods where it slowly drains into the sound."

Currently Purvis is more concerned about the amount of fertilizer entering the sound than he is about pesticide runoff.

"There's a good chance we'll have a bad algal bloom on the sound this summer," said Purvis. "We've had phenomenal rainfall which has made salinities in the sound very low. A lot of nitrogen, phosphorous and potassium is also entering the water from fertilizer runoff. We're also concerned about pesticide runoff and are studying it. Right now, most of the areas closed to oystering are a result of organic pollution."

There are several questions about big farms that bother Luszcz, Purvis and others concerned about the future of eastern North Carolina. Some of the big farms have failed. Yet there's talk of building giant developments on the cleared real estate that these farms have created. Wind erosion is also becoming a serious problem. With openings stretching for over 10 miles without a windbreak, and with widespread drainage projects underway, could a mini "dust bowl" occur? And lastly, what long-term interest do large outside corporations have in conserving North Carolina's natural resources and maintaining the integrity of the land?

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA and director of the N.C. Wildlife Resources Commission's news program.

Good Fishing Close To Home

by Fred Harris

That's one of the goals in an extensive program to improve fishing in our many city lakes.

"You know," I remarked between bouts of shivering, "we could have become accountants or teachers and be at home sleeping right now." My partner, Scott Van Horn, mumbled something in reply and tried to sink deeper into his many layers of clothes.

This rather profound conversation was taking place an hour past midnight on an unusually cold and foggy May morning. Scott and I are fishery biologists for the N.C. Wildlife Resources Commission and we were concluding an annual largemouth bass population study at Lake Higgins, a water supply reservoir for the city of Greensboro. During many preceding days and nights, we and several other biologists had captured, tagged, and released over 2,500 of the lake's largemouth bass in an effort to learn more about their population size and structure. This study is one of several projects that the Wildlife Commission's Division of Inland Fisheries conducts as part of its city lake management program.

The history of the Wildlife Commission's involvement in city lake management dates back to the 1960's. During that period, the Commission recognized the great potential of municipal water supply lakes for providing public fishing. By their very nature, the lakes were located near population centers and thus were easily accessible to many people. However, little effort was being expended to maintain or improve the quality of the fishing in these lakes.

In 1968, the Wildlife Commission entered into an agreement to manage the fisheries if cooperating cities would open their lakes to public fishing at a nominal cost. Funds resulting from the fees were to be used by the cities to cover the expenses they incurred by allowing public fishing. In turn, the Commission's Division of Inland Fisheries agreed to manage the fish populations in each lake to provide the best possible fishing. Through the years, the program has grown in popularity and today, 42 city lakes scattered throughout the State are managed under this type agreement.

LAKES UNDER MANAGEMENT

1	Waynesville Lake	15	Lake Hunt	29	Pineville Lake
2	Tomahawk Lake	16	Municipal Lake	30	Lucas Lake
3	Lakewood Park	17	Lake Concord	31	Southern Pines Res.
4	Freedom Park Lake	18	Lake Fisher	32	Lake Michie
5	Park Road Park Lake	19	Lake Higgins	33	Butner Lake
6	Hornet's Nest Park	20	Lake Brandt	34	New Franklinton Lake
7	John H. Moss Lake	21	Lake Townsend	35	Old Franklinton Lake
8	Finch Park Lake	22	Lake Burlington	36	Lake Rogers
9	Old Lexington Lake	23	Quaker Creek Lake	37	Simpkins Pond
10	Lake Thom-A-Lex	24	Cane Creek	38	Rocky Mt. City Lake
11	High Point City Lake	25	Wadesboro City Lake	39	Wiggins Mill Res.
12	Oak Hollow Lake	26	Hamlet City Lake	40	Toisnot Lake
13	Kernersville Lake	27	Siler City Lake	41	Wilson Lake
14	Salem Lake	28	Ramseur Lake	42	Hope Mills Lake

In order to effectively manage these fishery resources, fishery surveys are conducted on all managed city lakes at frequent intervals. The fish populations are sampled by electrofishing (temporarily stunning fish with an electric current operated from a boat) and by netting and seining. These samples provide information concerning the growth rates, size distributions, and relative abundance of the various fish species residing in a lake. This information is used to determine the success of previous management practices and to evaluate present lake management needs.

Angler catch surveys are carried out at some lakes to determine the kinds and numbers of fish that fishermen catch. Since the true test of a successful fishery management program is whether or not it improves fishing, catch surveys are very useful for evaluating new management practices. This type of survey also provides information concerning the kinds of fish fishermen want to catch. As a result of these surveys, Commission biologists are able to concentrate their management efforts in areas that are most responsive to angler desires.

The application of information obtained through various surveys has produced several fishery management practices that are routinely carried out on city lakes. Three common practices are: threadfin shad introductions, fish attractor installations, and channel catfish introduction.

Threadfin Shad Introductions

The threadfin shad is a close relative of the more common gizzard shad, but does not grow nearly as large. Attaining a maximum size of five or six inches by feeding on microscopic organisms, the threadfin shad is an excellent food for fish-

This fine string of channel catfish is being checked by a city lake warden and will be recorded to help determine the lake's total productivity.

eating species such as crappie and largemouth bass. Many city lakes receive periodic stockings of this forage fish which allow the lakes to support larger populations of bass and crappie than would occur naturally. The larger populations of sport fish in turn provide the ultimate benefit which is better fishing and larger catches.

During most years, the shad are able to maintain their numbers through natural reproduction. However, severe winters may drop water temperatures below the lethal level for threadfin shad, resulting in a complete die-off of the species. Therefore, each spring, representative lakes must be checked to determine whether or not the shad survived the winter. If few or no shad are found, the lakes are restocked to ensure an adequate food supply for the bass and crappie.

Fish Attractors

Many city lakes are relatively barren of cover because their basins were cleared of trees and brush prior to being filled with water. As a result, there is little natural structure to concentrate fish in particular areas. This makes finding fish more difficult, particularly for anglers unfamiliar with a lake. To help solve this problem, fish attractors in the form of brush piles, old Christmas trees, or, more commonly, old automobile tires are placed in the lakes. (See "Wildlife in North Carolina," July 1978.) Old automobile tires are usually preferred because they do not affect water quality and they provide a permanent structure.

When tires are tied together in large bundles and sunk, they begin attracting small bait fish almost immediately. The presence of these small fish soon attract larger game fish which the fishermen can catch. Small buoys are used to mark fish attractor locations. However, maintaining the marker buoys has been a problem and many sites are now unmarked. A new method of marking fish attractors using signs posted on the shoreline is being tried at several lakes. Local lake wardens usually can provide general locations of the fish attractors and can describe any markers being used.

photographs by Ken Taylor

Fish population samples are taken periodically on lakes under study. Here, fishery biologists operate an electrofishing device which stuns the fish in the immediate area. These fish are carefully netted and later returned to the water, after important data has been recorded.

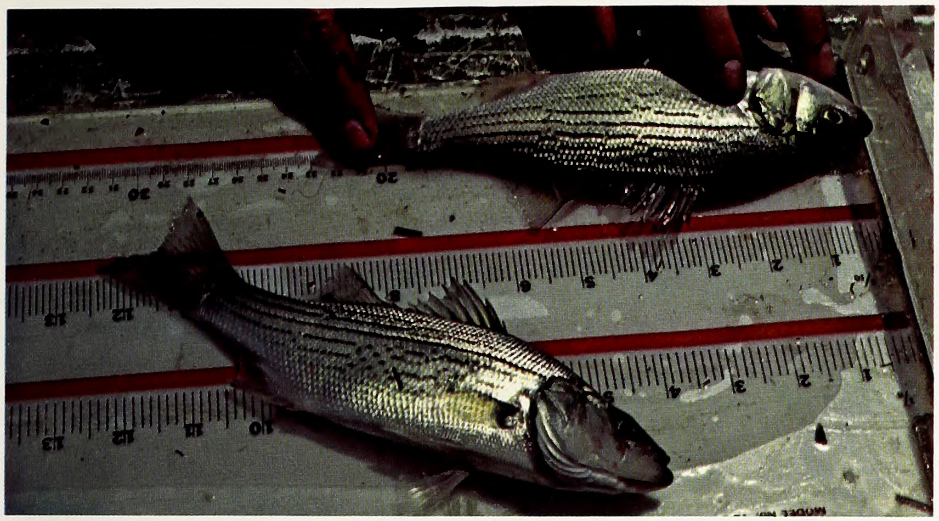
Channel Catfish Introductions

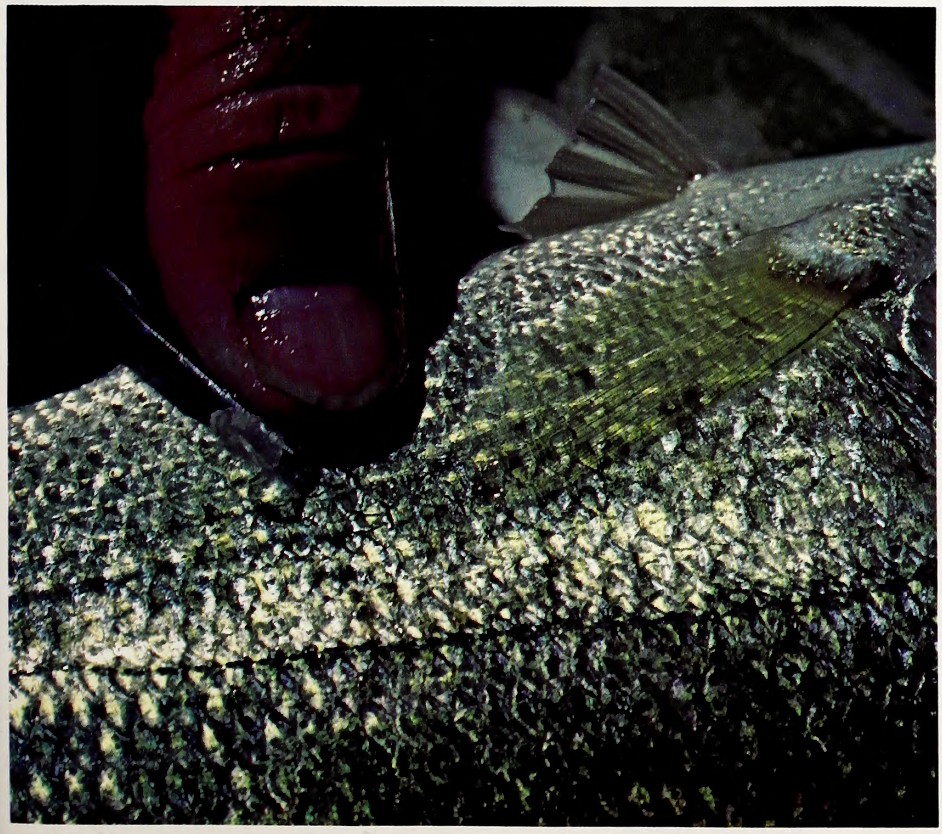
Channel catfish are very popular among Tar Heel anglers. These fish grow rapidly to a large size, readily bite a baited hook, and provide excellent tablefare. Unfortunately, the lack of suitable spawning sites and the predation of young by other fish, severely limit channel catfish reproduction in most city lakes. Therefore, channel catfish are stocked at infrequent intervals in many city lakes to make up for the lack of natural reproduction. These stockings maintain sport fisheries for channel catfish that otherwise would not exist.

In addition to these three management practices, several research projects are currently being conducted at selected city lakes. Since personnel and time are limited, research toward developing new management techniques must be confined to relatively few lakes. If research demonstrates that a new management technique is successful in improving fishing, then the technique may be applied to other lakes. The following is a brief description of three current research projects being conducted by the Wildlife Commission at various city lakes in North Carolina.

The first is an intensive study of the largemouth bass population in Lake Higgins near Greensboro. Each spring, 1,000 to 3,000 bass are captured by electrofishing, marked and released back into this lake. Subsequent recaptures of these marked fish provide information regarding the number of bass living in the lake and their size distribution. Data collected to date indicate that the numbers of legal size bass in Lake Higgins average around seven to 10 per acre in spite of heavy fishing pressure. However, few very large bass are found in the lake, indicating that most are caught before reaching old age. This and other information obtained in the study are providing valuable insights regarding the effects of heavy fishing pressure on largemouth bass populations.

Research is also underway on the value of restrictive size regulations. Lakes Cane (Monroe), Higgins (Greensboro), Thom-a-lex (Thomasville-Lexington) and Tillery, a power reservoir, are being used to evaluate an 18-minimum size limit on largemouth bass. Since these lakes receive very heavy fishing pressure for bass, catch rates are low and few bass survive to reach a trophy size. Increasing the minimum length limit appears to be the most practical way of solving this problem. The 18-inch minimum size limit is being studied to determine the changes in size and numbers of bass resulting from the decrease in harvest. Should sizes and numbers of bass increase as expected, then more fishermen will be able to enjoy the experience of catch-





An important fish species being studied in this project is the hybrid striped bass X white bass cross. These two nine-inchers are being measured and will be returned to the water. Several lakes now provide excellent hybrid bass angling, (Left) Many of the fish sampled are marked with a plastic "spaghetti" tag which has a reference number for identification if it is returned by a fisherman or shows up in later sampling (Middle). Scale samples carefully removed from selected fish will reveal the age of the fish. Biologists will examine the scales under magnification and count the growth rings formed annually (below).

ing larger-sized bass and fishery managers will have a new tool for rejuvenating bass populations.

Also, research is underway on a hybrid fish developed by crossing white bass and striped bass. The potential of white bass-striped bass hybrids in city lake management is being studied at Higgins, as well as Lakes Fisher (Concord), Oak Hollow (High Point), and Wadesboro. Other states have had success with this fish in reservoirs, but the hybrid has never been tried in small lakes. White bass-striped bass hybrids are being produced from wild fish at our warm-water fish hatcheries. These are stocked annually in the above lakes as two- to three-inch fingerlings and their food preferences, growth and catchability are being examined. Preliminary indications are that the hybrids grow rapidly, eat small sunfish, and are very easily caught. If the results continue to be favorable in the experimental lakes, the white bass-striped bass hybrid may have wide use in city lake management.

These are some of the activities that make up the Wildlife Commission's city lake program. In the future, projected increases in fishing pressure will intensify the demands placed upon all fishery resources. Fortunately, the city lake management program provides a means for meeting some of these demands. Continued cooperation between municipalities, Wildlife Commission, and sportsmen will ensure the perpetuation of these valuable fisheries.

Fred Harris is a biologist for the N.C. Wildlife Resources Commission's Division of Inland Fisheries. He is coordinator of all fisheries research for the Piedmont region of North Carolina.

The Mystery Of The Disappearing Doves

Why do doves move around so much, and where do they go? At last, biologists have some answers.

Luther Partin

The summer of 1976 was dry. It was especially bad for farmers in eastern North Carolina, and even worse for farmers in lower Wake and Harnett counties.

But what was bad luck for the farmers looked like good luck for the dove hunters on WSD Farms Game Land in Harnett County. The landowner has about 40 acres of barley that was so severely affected by the drought that he felt it wouldn't be economical to harvest. He agreed to let the Wildlife Commission mow it and use it for public dove hunting. Even though some millet is planted for doves every year on this farm, it looked as though this was going to increase the amount of acreage attractive to doves by about 10 times.

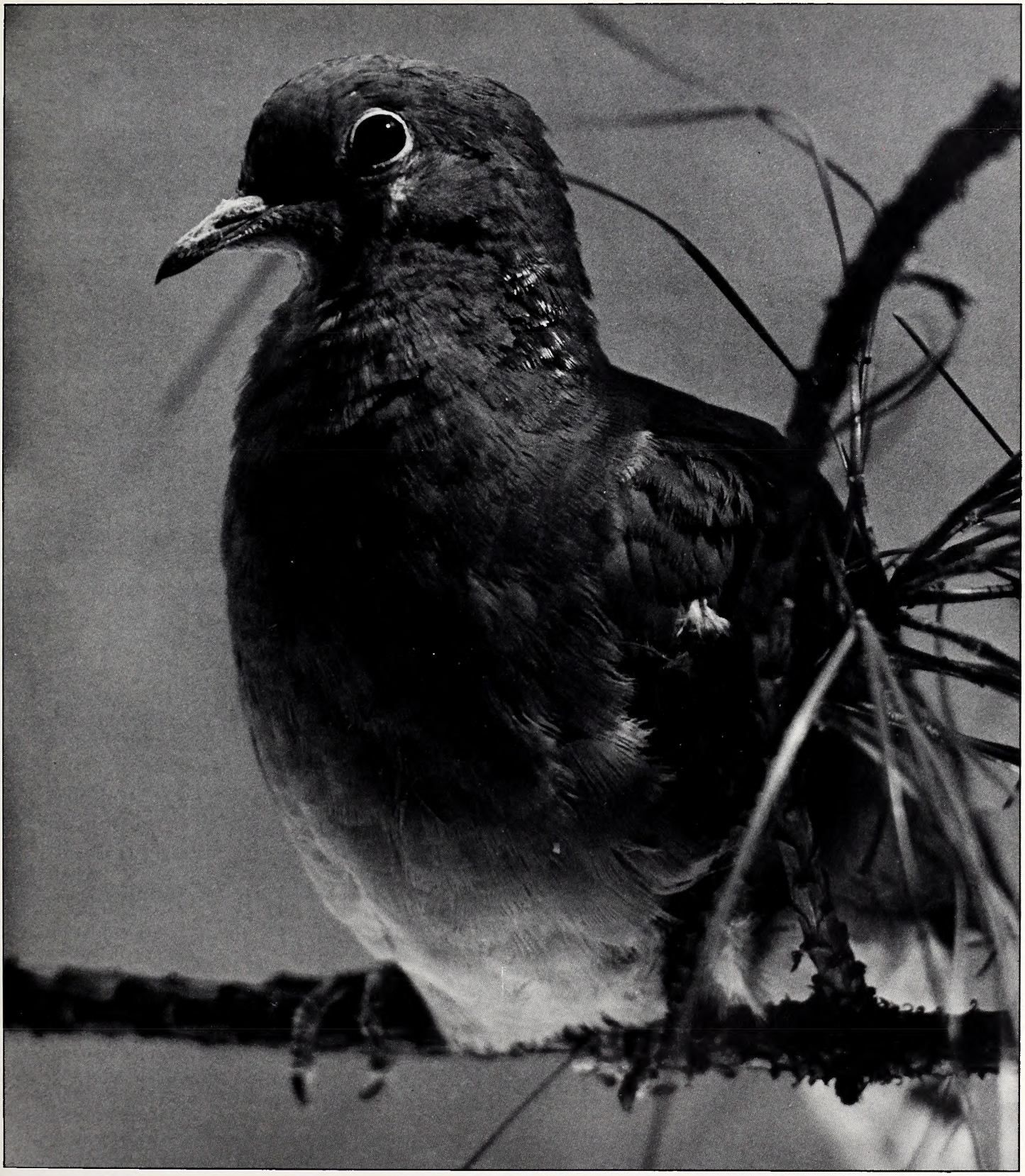
Two weeks before the season opened, a game lands crew went in and bush-hogged both the millet and the barley. Sure enough, within a couple of days, the place was wrapped up with large flocks of doves. It really got to me, seeing all those doves, especially since I knew I was going to have to work opening day. That's one of the drawbacks of being a wildlife biologist, I guess. Things looked really good right up until two days before the season opened. Then the doves started disappearing.

By opening day, only a few stragglers could be found. Most of the hunters on opening day were as surprised as I was to find so few doves. Grain was still plentiful and no one to my knowledge had slipped in and "opened the season early."

I really shouldn't have been too surprised. I had seen it happen before. In fact, biologists and hunters alike have been aware of this early September drop in dove numbers for many years. Dr. Thomas Quay's classic publication on mourning dove populations in North Carolina in 1954 showed results of roadside counts involving over 350 thousand miles of driving. These counts showed up to a 70 percent drop in the number of doves seen during the first part of September.

Where did they go? Where did they come from? And how many doves are we talking about? Up until November of last year, we really didn't have any good answers to these questions. That is when the Southeastern Association of Game and Fish Agencies published Technical Bulletin No. 3 by Don Hayne and Paul Geissler. This bulletin summed up the results of field studies conducted by State wildlife agencies from 1966 through 1971. These studies included results of banding hundreds of thousands of mourning doves, thousands of call count trips, examination of over 10,000 wings from hunter bag checks, and numerous surveys of hunter experience. Since Dr. Quay's publication in 1954, not only have we

by Carl Betsill



Luther Partin

had the opportunity to make all these additional field studies, but we have entered the computer age. This makes possible detailed analysis of this data that would have been impossible in the fifties. Let's take a look at the results of some of this analysis.

First, how many doves are there? By looking at total harvest estimated from mail surveys, age ratios from hunter bag checks, breeding population indexes from spring call count censuses, and banding and recovery data including reporting rates for banded doves, it is possible to estimate the proportion of doves within a population that has been banded. Once this is done, you can then use the number of banded doves and the proportion banded of the total population to indicate the total population size. In case that's a bit confusing, consider

the results. The estimates ranged from a high of 33,157,400 doves in 1970 to a low of 14,463,400 doves in 1966. The average over the six years of the study was 27,008,100 doves. Want more details? Well in case someone should ask, you can tell them that in 1971, there were 7,664,600 adult doves and 21,536,800 immature doves in North Carolina. By the way, there are 52,712 square miles in North Carolina. Why don't some of you mathematically inclined types take a look at how many doves per square mile that is. You might be shocked! How accurate are these figures? Well considering the total population estimate of 27 million doves, if we give or take five million or so, we feel we're in the ball park. In other words, this is an educated guess, but believe me it's the most educated guess we've ever had.

The next question is where did the doves come from? North Carolina hunters harvested an average of 3,265,600 doves per year from 1966 until 1971. We wanted to learn how many of these originated outside of North Carolina and what states were most important in contributing doves to North Carolina's harvest. These are the questions answered in Table 1. North Carolina's harvest contains birds from 17 other states. This table lists these states and gives an estimate of how many doves were harvested in North Carolina from each.

Now we come to the question of where the doves go. That 70 percent reduction in dove numbers in September that we talked about in the introduction must mean we are producing a lot of birds for other states to harvest. Wrong! Only five states; Alabama, Florida, Georgia, South Carolina and Virginia report killing birds originating in North Carolina. North Carolina contributes only 121,200 birds to the harvest in other states while 521,600 are contributed by other states to our harvest. Why other states do not benefit from the apparently large exodus of birds from our State in September remains a mystery. Perhaps the doves are really not leaving at all but, for some unknown reason, are just becoming less visible from the roadsides in September. Perhaps they are in fact leaving but are just not being killed by hunters in other states. To find answers to these questions will take more field work, or at least a closer look at the information we now have. These little mysteries make working with wildlife populations interesting. We will never know all the answers but we sure know a lot more than we did before good ol' Technical Bulletin No. 3.

Some people believe that hunting

Curtis Wooten

pressure is the reason doves migrate. These folks often also believe that overall dove populations are in trouble as a result of hunting. Actually, neither is the case. It's far more complex.

For example, of the 27 million doves present in North Carolina each fall, only about seven million of these are adults. For us to have approximately the same number of doves each year at approximately the same age ratio would mean that 20 million doves must die each year. That's a 74 percent annual mortality! It's been estimated that hunters kill around three million doves annually. That leaves 17 million which die of other causes. These other causes include loss from predation, disease, parasites, accidents, weather, starvation and stress.

What would happen if dove hunting were stopped? Would we have three million more doves? No. Research has shown that in most cases mortality factors are compensatory. This simply means that when one mortality factor — for example,loss from predation or hunting — is reduced, another mortality factor — such as disease — will increase. This is nature's way of keeping the population at a level at which it will not do damage to its own habitat. If hunting were stopped, other mortality factors would soon take its place.

Of course, these principles also apply to other game species as well. As a general rule, in most small game species, 70 to 80 percent of the population dies and is replaced each year.

And so it is with doves. With each study, we learn more. Some day, it may even be possible to find out how far you ought to lead a dove which is riding a 20 mile per hour tailwind.

Carl Betsill is a game biologist for the N.C. Wildlife Resources Commission's Division of Game.

Shown here are the states contributing doves to North Carolina's harvest and the number of birds North Carolina hunters harvest from each.

State of Origin	Number Harvested in North Carolina	State of Origin	Number Harvested in North Carolina
Delaware	4,300	New York	42,900
Georgia	11,700	North Carolina	2,744,000
Illinois	20,600	Pennsylvania	16,400
Kentucky	14,400	Rhode Island	4,300
Maryland	9,900	South Carolina	197,400
Massachusetts	4,100	Tennessee	5,800
Michigan	6,300	Virginia	125,100
Minnesota	6,200	West Virginia	17,200
New Jersey	5,100	Wisconsin	29,900

Jumping Frogs Suffer Trauma

It's A Frog's Life!

The Fund for Animals has done it again. This time it's coming to the aid of frogs it claims are being cruelly mistreated, according to a recent UPI story.

The Washington based protectionist organization has charged that the frogs used in the Calaveras County Fair and Jumping Frog Jubilee are mistreated. Folks in Calaveras County, California, aren't taking this lightly. They've been holding frog jumping contests ever since the Gold Rush days of 1849, and a Missouri gentleman named Samuel Clemens made their entertainment famous when he wrote his classic short story "The Celebrated Jumping Frog of Calaveras County."

The Fund for Animals has charged that "during the contest, the frogs are jumped at, kicked at, and yelled at to make them jump farther." As if the mental turmoil the race produces in the frogs isn't enough, the Fund further charged that the "frogs sometimes die during the four days of the contest from the heat, from not being kept wet, and the trauma of the contest."

Local fair officials deny this charge, and answer that the frogs are wet down twice a day and that the frogs' "handlers" usually keep them in a bucket swathed in cool, wet rags to make them jump better.

The Fund has also charged that after the contest, some of the frogs are eaten.

If the Fund for Animals doesn't like frog jumping contests, they'd have a conniption if they ever found out what us frog giggers are up to.

— Mark Taylor

May Enforcement Report

For the month of May, 1978, the North Carolina Wildlife Resources Commission checked a total of 26,438 hunters and fishermen and 8,348 boaters.

Of the hunters and fishermen, 1,302 were prosecuted and 1,199 convictions were obtained. The total fines collected tallied up to $6,739.00 and the total costs collected were $28,586.50.

Of the boaters, 348 prosecutions were made and 310 convictions obtained. Total fines collected tallied up to $480.00 and total costs collected were $7,440.50.

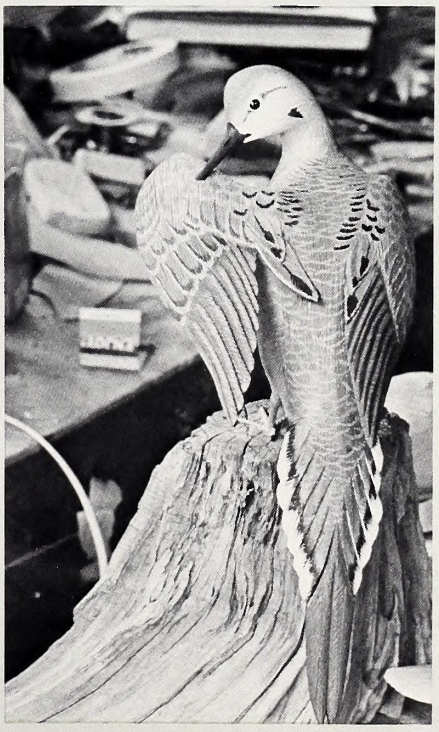
Other prosecutions totaled 20 and convictions totaled 18. Total fines collected tallied up to $350.00 and total costs collected tallied up to $405.00.

All fines and any arrests or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the Wildlife Resources Commission or its employees.

Waterfowl Festival Scheduled

Several North Carolina artists and craftsmen will be represented in the third Mid-Atlantic Waterfowl Festival to be held September 29 through October 1, 1978. The Virginia Beach Civic Center (Dome) at 19th Street and Pacific Avenue is the site of this year's exhibit of decorative carvings, bird sculpture and outstanding wildlife art. The country's leading artists and craftsmen will be present displaying and selling their creations.

The Festival will have interesting exhibits of antique decoys, hunting equipment and other mementos of bygone days of waterfowl hunting. Admission is $2 and all proceeds will go to the establishment of a wildfowl museum. For further information contact Thomas J O'Connor, III, PO Box 651, Virginia Beach, Virginia 23451.



Curtis Waterfield, a carver from Knotts Island, created and displayed this life-sized mourning dove in last year's Mid-Atlantic Waterfowl Festival.

Forest Service Studies Wilderness Proposals

North Carolina may have more of its federal lands locked up in wilderness areas if Congress approves the addition of 210,000 acres of National Forest to the National Wilderness Preservation system. The land has been nominated for wilderness classification under the Forest Service's current Roadless Area Review and Evaluation Program II (RARE II).

Most of the proposed areas are in the mountains where all of the State's currently designated wilderness areas are located. The 19 proposed mountain sites cover approximately 175,000 acres. Another site located in the Uwharrie National Forest covers 6,810 acres while four sites in the Croatan National Forest occupy 25,190 acres.

Approximately 210,000 acres of National Forest land in North Carolina is being considered for wilderness designation under the Forest Service's RARE II program. Of the 26 proposed areas, 19 are in the mountains.

"The Forest Service has no official position on whether these sites should become wilderness," said Walter Rule, public information officer for the National Forests in North Carolina. "These 24 areas were nominated for wilderness at a series of public meetings we held. All of the areas nominated have been studied and meet the criteria for wilderness. Only an act of Congress can put them into a wilderness designation; the Forest Service cannot make that decision."

In Forest Service wilderness areas, hunting and fishing, noncommercial gathering of plants and berries, grazing livestock and camping and hiking are allowed. The Wilderness Act prohibits the use of any motorized vehicles or equipment in a wilderness area. All timber harvesting is also prohibited, including cutting firewood. No permanent structures may be built, and nonconforming structures, such as pipelines and radio towers usually aren't allowed in a wilderness area.

Stocking wildlife in wilderness areas managed by the Forest Service is allowed, under certain conditions. The manner of stocking must be compatible with wilderness values, so no motorized vehicles or equipment may be used. Exotics can't be introduced, but animals that were historically native to that area in recent history can be stocked. For instance, wild turkeys can be stocked in these areas as long as they were once found there. The same policy holds true with fish, but with one difference. Any fish species found or stocked in water in a wilderness area prior to its designation as wilderness would be considered a native, even though it may be an exotic.

The impact of wilderness classification in these areas would probably have detrimental effects on some species of wildlife.

"Most of our wildlife management is done through habitat manipulations, and the chief tool for habitat manipulation is timber management," said Melvin Hopkins, wildlife staff officer for the National Forests in North Carolina. "If we aren't allowed to manipulate habitat through cuttings, there's really very little wildlife management we can do."

According to Hopkins, deer, wild turkey, rabbit and small game would not do too well in these areas because all of them need some openings to feed in.

Very few species do well under pure wilderness management in North Carolina. Black bear need solitude and mature trees for denning, but they also need openings to feed in. If a wilderness area is located near a bald where they can feed in the bald and den in the wilderness area, they will do well. Squirrels and certain birds and reptiles also do well in wilderness. But these species will fair just as well in a managed forest if timber cutting rotations and access are adjusted to fit their needs.

"What wildlife needs is a healthy diversity of habitat in an area," said Hopkins. "In a mature forest, there's very little ground level vegetation because of the age and shading effect of the trees. So except for a few species, most animals don't do well there. The only time you get openings in a natural forest is when you have an ecological disaster, like a forest fire or a serious disease outbreak. Then you get more open areas than you need. It's either feast or famine in wilderness areas.

Much of the criticism leveled at wilderness areas has arisen over natural disasters. If a forest fire, disease outbreak, or some other disaster occurs in a wilderness area, it is usually allowed to run its course. Sometimes its course runs out of the wilderness area.

The most recent example of this occurred in Maine's Baxter State Park last summer. The Park was left to the State with the stipulation that it remain "forever wild." When a serious fire broke out last summer in a windfall area, a group of preservationists introduced a suit into court to stop the Park Authority from using mechanized equipment to put out the fire, even though the fire threatened to engulf the Park. The blaze eventually destroyed 3,500 acres of land within the Park

before it was extinguished. A similar case occurred in Michigan's Seney wilderness fire in 1976, when a fire started in the Seney Wilderness Area and wasn't put out. Due to dry weather conditions and high winds, the fire escaped from the wilderness area and burned approximately 70,000 acres of wilderness and adjacent lands before it was brought under control.

"Fire is a natural part of the ecosystem; so if one starts in a wilderness area, we usually let it burn if it's not a wildfire," said Rule. "We always put out a fire if it threatened lands outside of the wilderness area's boundaries. The same goes for insect outbreaks. If the damage will be confined to the wilderness area, we let it run its course. We can't justify going into a wilderness area to stop a fire or a disease outbreak just to protect the scenery. When there's a fire in a wilderness area, we're ready to contain it if it looks like it will spread; but anytime you let a fire burn, you're taking a calculated risk."

In some areas, the Forest Service uses controlled burns in an area to get the land back to its natural state if fire played a big role in the ecology of the area. This is not being done on any National Forest land in the South.

The RARE II Program was originally developed after the RARE I Program was discarded. When RARE I was instituted, all of the proposed wilderness lands were west of the Mississippi. President Carter decided that we needed more wilderness land in the east close to the homes of the majority of the people. The designations for wilderness were then changed to include land that had once been used by man but is now in a wild state. The amount of land proposed for wilderness designation in the nation under RARE II is considerable — about 66 million acres, which is equivalent to the size of the State of Colorado.

Anyone who wants more information on the RARE II lands or who wishes to comment on these proposals should contact National Forests in North Carolina, Walter Rule, Public Information Officer, PO Box 2750, Asheville, North Carolina 28802.

— Mark Taylor

Pittman-Robertson Act Upheld Against Suit

Deer, rabbits and other wildlife will continue to get tax benefits. Or to put it another way, wildlife management and research will still be heavily supported by excise taxes on guns, archery gear and other sporting equipment. A lawsuit which would have wiped out such a highly successful program, has been thrown out of court.

The U.S. District Court for the District of Columbia has dismissed a suit brought by the Committee for Humane Legislation and Friends of Animals to kill the Federal Aid in Wildlife Restoration Program, according to the Wildlife Management Institute. The federal aid monies are raised through an excise tax on hunting and archery equipment. Judge Charles R. Richey dismissed the case after the U.S. Fish and Wildlife Service and the plantiffs agreed to a settlement.

The suit had requested the Court to "restrain" the Service from further "payments" to state wildlife agencies until environmental impact statements were completed on the overall program and the thousands of specific projects undertaken with the Program's funds.

The Federal Aid in Wildlife Restoration Program, commonly known as the Pittman-Robertson or P-R Program, is funded by an 11 percent excise tax on sporting arms and ammunition, handguns, and archery equipment. The taxes are collected by the federal government and apportioned through the Fish and Wildlife Service to state wildlife agencies for wildlife conservation. This year, $62.9 million has been apportioned to the states under the P-R Program.

In settlement, the Service agreed to: 1) publish a draft programmatic Environmental Impact Statement by July 1, 1978, (it had planned to do that already); 2) hold at least one public hearing in Washington, D.C. on the draft statement (that also was planned already); 3) provide a computer listing by project of all work funded by P-R, and 4) designate a place in Washington where environmental assessments on current projects may be examined by the public.

The protectionists, in agreeing to the settlement, also tried to get the Court to hold the case in abeyance. They apparently wanted to have their cake and eat it too. But Judge Richey would have none of that and dismissed the case without prejudice. The protectionists still can challenge the EIS when it is completed, but their attempt to upset the P-R Program appears stalled.

— Mark Taylor

Woodchopper Spare That Snag

Why leave a gnarled, dead tree standing in the forest? It might be a safety or fire hazard. Or, it could be ground into chips for paper pulp or make someone a good supply of firewood. According to a new U.S. Department of Agriculture Handbook, however, it's environmentally important to leave some dead trees in the forest for the birds, especially birds that nest in holes or cavities.

The new pocket-sized paperback book, Agriculture Handbook 511, is entitled, "Cavity-nesting Birds of North American Forests." It was published by the Forest Service as an aid to owners and managers of forest lands, but should be equally useful to teachers, park naturalists, land use planners, and anyone with a special interest in birds.

The book summarizes what is currently known about the habitat requirements of 85 bird species dependent on cavities for rearing their young. It is illustrated with color drawings prepared by Arthur Singer for "A Guide To Field Identification: Birds of North America," by Robbins, Brunn, and Zim.

The handbook is co-authored by Wildlife Biologists Virgil Scott and Charles Stone of the U.S. Fish and Wildlife Service, and Keith Evans and David Patton of the U.S. Forest Service.

Copies may be purchased for $2.75 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20902. Specify GPO Stock No. 001-000-03726-4, as well as the complete title of the book.

Fishing Reg. Hearings Set

Three public hearings on the proposed fishing regulations for 1979 are planned for the month of September.

On September 18, a public hearings will be held in Asheville at the courthouse at 7:30 p.m.

On September 19, a public hearing will be held in Salisbury at the courthouse at 7:30 p.m.

On September 20, a public hearing will be held in Greenville at the courthouse at 7:30 p.m.

Great Flood Programs Available

A Flood Damage Report showing the massive damages caused by extensive flooding in western North Carolina last November has recently been published by the N.C. Department of Transportation.

The 20-page pictorial account shows a sample of some of the disastrous effects of the flood, and also shows some of the N.C. Department of Transportation's initial repair work.

Supplies of the flood report are limited, but copies have been sent to public libraries throughout the State. A slide presentation showing the damage the flooding caused is also available to the public.

For more information on the slide presentation, contact the N.C. Department of Transportation, Public Affairs Office, Box 25201, Raleigh, N.C. 27611.

Threatened Or Thriving?

Minnesota Timber Wolves Center Of Controversy

The gray wolf, commonly known as the timber wolf, has been reclassified from endangered to threatened in Minnesota, culminating a heated controversy over the animal's status in the only one of the lower 48 states that still supports a viable population of the species, according to the National Wildlife Federation.

According to the U.S. Fish and Wildlife Service (FWS), the reclassification reflects the increase in numbers, extension of the animal's range in northern Minnesota, and the fact that it is no longer in danger of extinction in that part of its range. Under the 1973 Endangered Species Act, a species is listed as "endangered" if it is in danger of extinction throughout all or a significant portion of its range; "threatened" means that a species is likely to become endangered within the foreseeable future throughout all or a portion of its range. The timber-wolf was once found throughout most of the East.

The gray wolf, also commonly known in the North as the timber wolf, has been a source of continuing controversy since it was listed as endangered in 1967. The Minnesota Department of Natural Resources has been pushing for complete removal of the timber wolf from the federal list because it contends that wolves population in Minnesota in 1976 was estimated at about 1,200, according to FWS. Prior to protection, an annual kill of 20-30 percent was occurring in Minnesota, according to the Eastern Timber Wolf Recovery Team, but the statewide wolf population did not noticeably decline. Recognized wolf expert David Mech, a member of the Recovery Team, has noted that the breeding potential of wolf populations with adequate prey and without mortality could at least double each year.

The latest action changing the status of the timber wolf was largely an outgrowth of recommendations of the Recovery Team issued in 1976. The team, by a vote of seven to one, determined that the wolf should remain on the endangered species list, but be reclassified as threatened in *Minnesota only*. (In 1974 the State of Minnesota petitioned FWS to exclude the wolf from the endangered list, but FWS took no action, pending the Recovery Team's recommendations).

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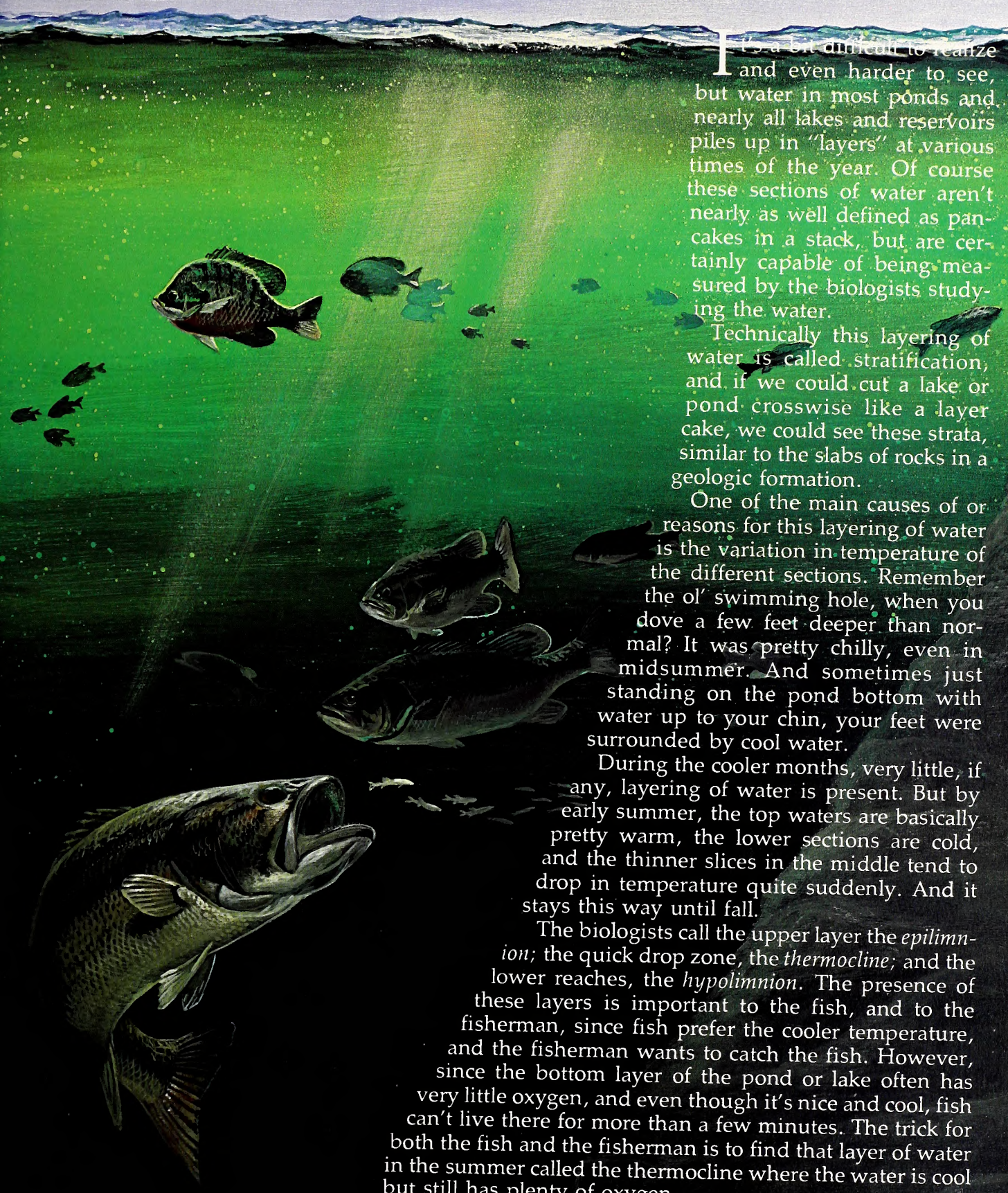
Nature's Ways

Layers of Water

written and illustrated by Duane Raver



It's a bit difficult to realize and even harder to see, but water in most ponds and nearly all lakes and reservoirs piles up in "layers" at various times of the year. Of course these sections of water aren't nearly as well defined as pancakes in a stack, but are certainly capable of being measured by the biologists studying the water.

Technically this layering of water is called stratification, and if we could cut a lake or pond crosswise like a layer cake, we could see these strata, similar to the slabs of rocks in a geologic formation.

One of the main causes of or reasons for this layering of water is the variation in temperature of the different sections. Remember the ol' swimming hole, when you dove a few feet deeper than normal? It was pretty chilly, even in midsummer. And sometimes just standing on the pond bottom with water up to your chin, your feet were surrounded by cool water.

During the cooler months, very little, if any, layering of water is present. But by early summer, the top waters are basically pretty warm, the lower sections are cold, and the thinner slices in the middle tend to drop in temperature quite suddenly. And it stays this way until fall.

The biologists call the upper layer the *epilimnion;* the quick drop zone, the *thermocline;* and the lower reaches, the *hypolimnion.* The presence of these layers is important to the fish, and to the fisherman, since fish prefer the cooler temperature, and the fisherman wants to catch the fish. However, since the bottom layer of the pond or lake often has very little oxygen, and even though it's nice and cool, fish can't live there for more than a few minutes. The trick for both the fish and the fisherman is to find that layer of water in the summer called the thermocline where the water is cool but still has plenty of oxygen.

Ken Taylor

"Superfarms" On The March

Hundreds of thousands of acres have been cleared in the Coastal Plain with the coming of the corporate "superfarms." Experts foresee both benefits and problems. Increased water pollution and siltation in Lake Phelps (shown above) and the sounds is one of the problems

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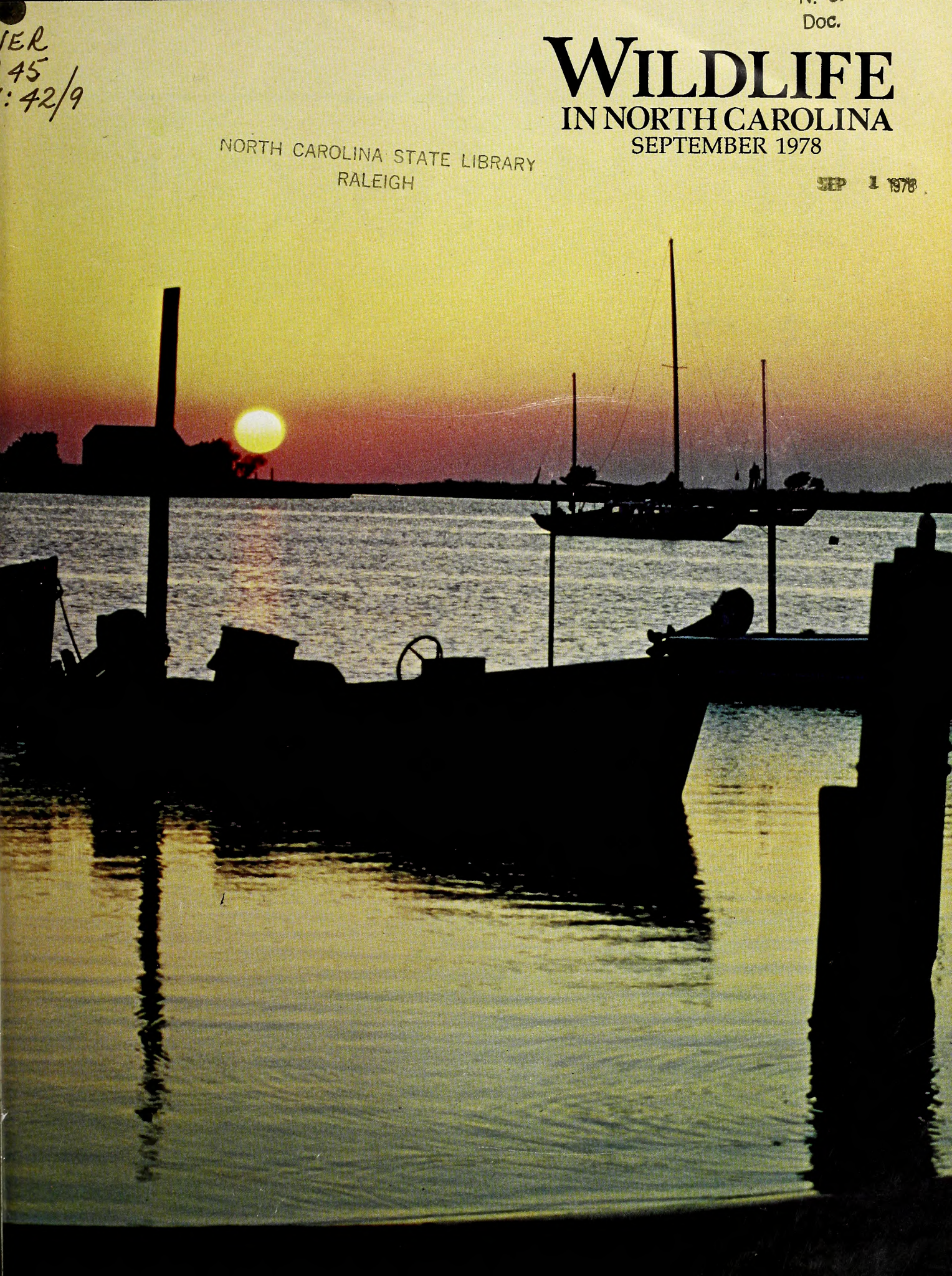


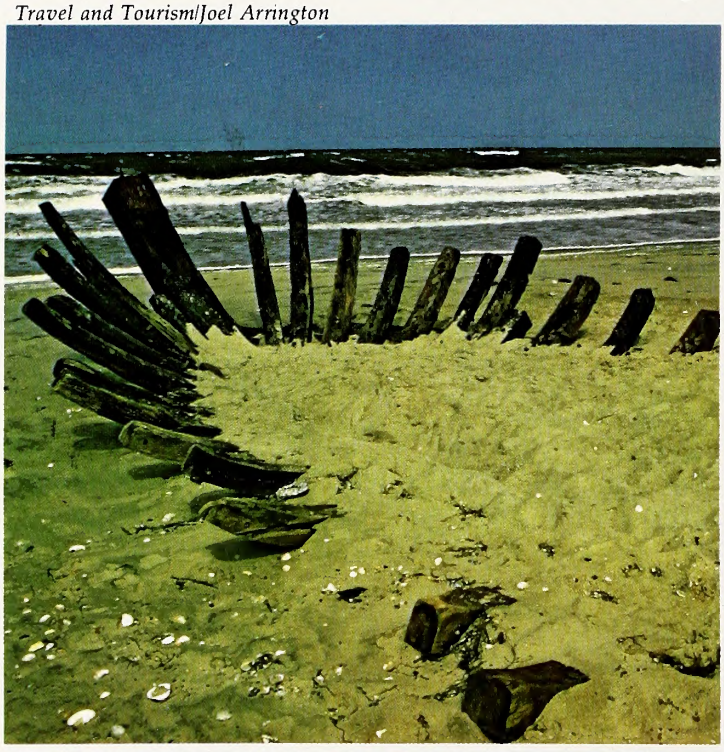
by Jim Dean

Last Port Of Call

The shifting sands uncover their bones from time to time, and those who walk the beaches of the Outer Banks often stop to look at them and wonder. What ship was this? Where did it come from? What cargo did it carry? How many lost their lives?

Shipwrecks along the Outer Banks, especially in the Cape Hatteras National Seashore, are not uncommon. Indeed, over the past 400 years or so, there have been more than 500 known shipwrecks in the area around Cape Hatteras alone. Small wonder the region is called "The Graveyard Of The Atlantic."

Travel and Tourism/Joel Arrington



Like the ribs of some long-dead mammal, the bones of wrecked ships can be found on the beaches of the Outer Banks. Some wrecks remain buried for years, only to be briefly uncovered.

Many of the wrecks are known, but others have lost their identity over the years and are seen only when storms uncover their bleached skeletons for brief periods.

Not all of the wrecks were accidental. Legend has it that many years ago, islanders would wait for a dark, stormy night and tie a lantern around a horse's head. Then, they would lead the animal up and down the dunes. A passing ship, confused by the storm, might assume that the light was from another ship working its way up the shore or resting safely at anchor. If the ship decided to follow the light, disaster was almost certain. The wreckers would then strip the stranded vessel. Some say the use of a lantern hung from the neck of a nag gave Nags Head its name. Others believe this section of the beach was named for a village in England called Nags Head.

Naval conflict has enveloped the Outer Banks on several occasions, strewing the beaches and shoals with the remains of warships from the American Revolution, the War Between the States and, more recently, World War II. Near Wilmington are the remains of several Confederate blockade runners which were gunned down or scuttled. The "Beauregard" lies only a hundred yards or so off Carolina Beach, its boilers still visible at low tide.

The "Beauregard" is still having an impact on the region because local fishermen know that at times it is wrapped up with weakfish, flounders and other desirable species. In the same sense, other wrecks off the coast ironically contribute to our present sport. Off Hatteras, two popular fishing wrecks are the "smell" wreck and the "oil" wreck. The former carried a cargo of sulphur, and anglers fishing over it say that they can often detect the acrid odor. The "oil" wreck leaches a small, but constant oil slick which helps charter boats find its location.

Those of us old enough to have visited the beaches during the late 1940's saw the oil on the beaches from ships torpedoed by German U-boats. Some even saw the offshore smoke from burning ships.

History, mystery, humor and pathos cloak the wrecks. One ship which came ashore on Hatteras long ago carried a large shipment of fine beaver felt tophats. For many years islanders wore the handsome hats.

Recently, the wreck of the famed Union "Monitor" was found off Hatteras where it sank in a storm when its tow rope snapped shortly after its well-known encounter with the Confederate "Merrimac." Many felt that the notorious "cheesebox on a raft" would never be found, but now there are hopes to eventually be able to raise the "Monitor."

Even the U.S. Coast Guard owes part of its early history to the Outer Banks. From the late 1700's until after World War II, the U.S. Life Saving Service operated stations along the beaches to assist the victims of wrecks. There are many stories of gallant rescues with oar-powered lifeboats launched through the booming surf. When possible, a cannon was used to shoot a line over the stranded vessel so that the crew could be brought ashore on a breeches buoy.

Even today, the treacherous water around the shifting sands threatens ships, and no doubt that will be true as long as men sail these waters for commerce or pleasure. And vacationers will continue to touch the bleached remains of wrecks and wonder what tragedies are locked in those weathered bones.

WILDLIFE IN NORTH CAROLINA

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Sunset across Silver Lake at Ocracoke seems to reflect the tranquility many people seek on the Outer Banks, especially in the nearby National Seashores.

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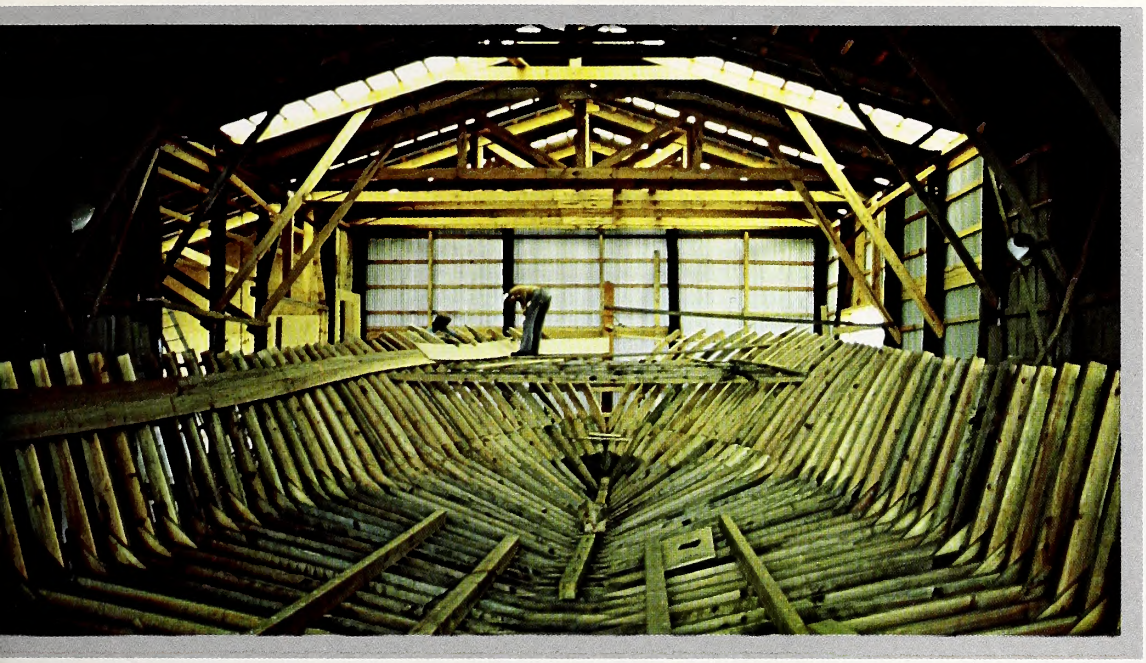
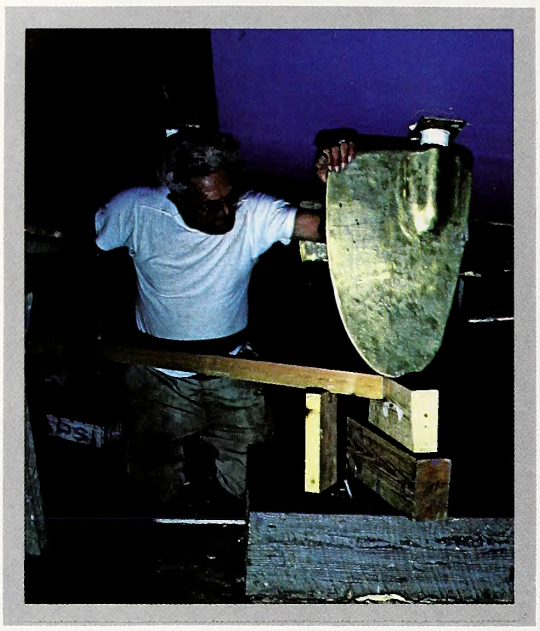
Harkers Island's Handmade Boats

The distinctive lines of the typical Harkers Island boat have remained unchanged for many years, and the craftsmen who make these boats out of juniper follow no blueprints to capture the graceful curve of the flared bow.

Photography by Ken Taylor

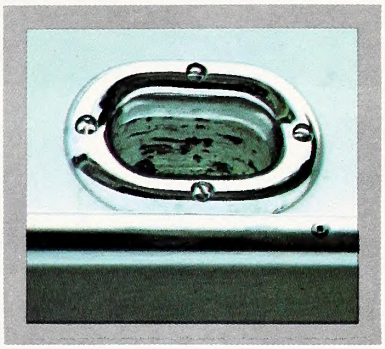


Most Harkers Island boats are fairly small, 16 to 30 feet, and they originated as work boats for commercial fishermen. Over the years, however, larger boats have become more common and more and more are being built for sport fishing and pleasure cruising. Some Harkers Island boats in the 65 to 85 foot class have been built. The fairly large boats being built in these photos (left and above) are under construction in the East Bay Boat Works, owned by Paul Gillikin.



The flaring bow (right) is perhaps the most noticeable characteristic of the typical Harkers Island boat, though some Harkers Island boats (below) display more variation. These are under construction at the original Rose Brothers Boat Works, Inc. which has been in business since 1928. Earl and James C. Rose currently own this well known institution.

The white cedar or juniper used in the construction of a Harkers Island hull is practically indestructible. With proper care and occasional reconditioning, old boats (below) seem to last forever. Small wonder that new boats take shape alongside old ones here at the Rose Brothers Boat Works. The Harkers Island boat seems to prove that utility is, indeed, beauty.



Cape Hatteras and Cape Lookout National Seashores give North Carolina 136 miles of gorgeous coastal wilderness and a few problems.

Our National Seashores

By Mark Taylor

You start with a large amount of sand. Add an ocean with plenty of fish, 400 years of shipwrecks, a few pirates, some lifesavers, a passel of scoundrels leading horses with lanterns slung under their necks, commercial fishermen, a generous dose of sea gulls and other feathered critters, two eccentric bicycle makers from Ohio, and other assorted ingredients. Mix thoroughly using hurricanes, rising and falling sea levels, shifting ocean currents, and changing ways of life. If you follow the recipe faithfully, once in a great while, you might come up with something resembling North Carolina's Outer Banks with Cape Hatteras at their center.

Last year, the heart of this salty concoction of surf, dunes, sand and unsurpassed beauty drew about two million visitors. For while much of the rest of North Carolina's coast is developed, often rather shoddily, our two National Seashores — Cape Hatteras and Cape Lookout — have retained much of their pristine beauty.

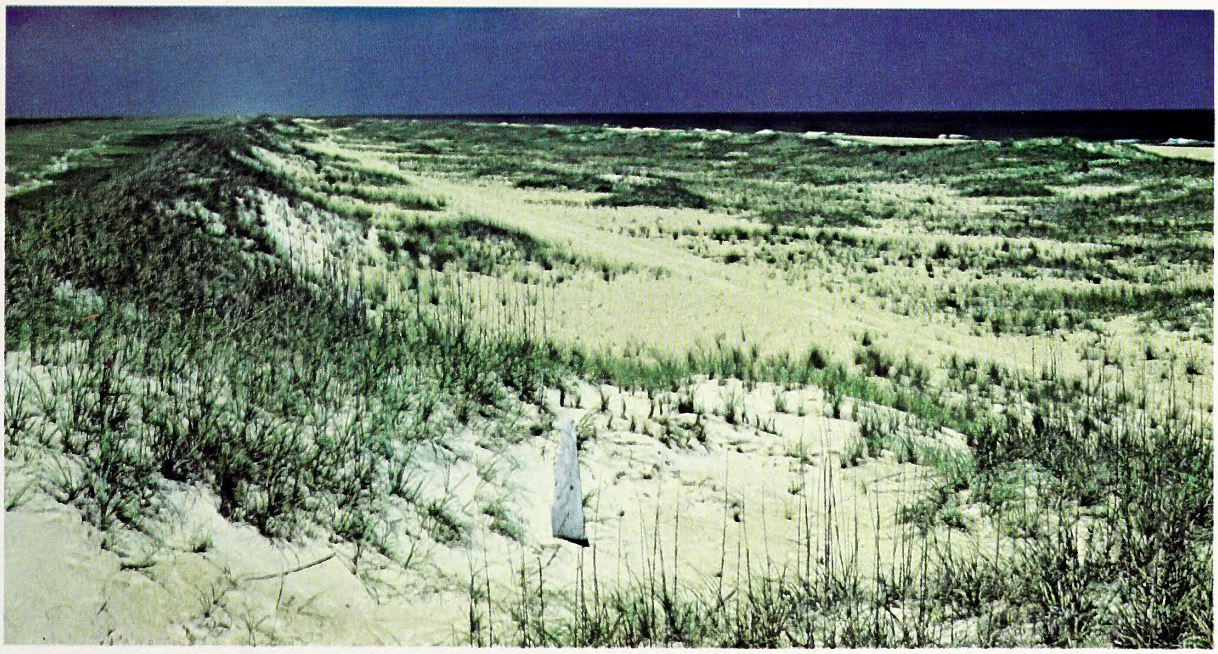
The Cape Hatteras National Seashore contains about 73 miles of barrier beach, and encompasses approximately 30,000 acres. The northern edge of the seashore's barrier beach system lies at Whalebone Junction on Bodie (pronounced "Body") Island. It runs south to the end of Bodie Island and includes a good deal of Hatteras Island, with the exception of several small villages. The Seashore includes almost all of Ocracoke Island. Several historic sites run by the National Park Service are also located near the Seashore, including the Wright Brothers Memorial near Kitty Hawk and the Fort Raleigh National Historic site in Manteo on Roanoke Island, where the National Seashore's headquarters are also located.

North Carolina's newest National Park — Cape Lookout National Seashore — starts where the Cape Hatteras National Seashore leaves off. It includes all of Portsmouth Island, runs south to include all of the Core Banks, and also includes the Shackleford Banks and Cape Lookout itself. All told, the new National Seashore, which was dedicated on July 4, 1976, includes 24,500 acres of land and includes 53 miles of ocean

Travel and Tourism/Clay Nolen

"Nace" Jennette in a flat-bottomed skiff Cape Hatteras, Pamlico Sound c. 1905

Ken Taylor



Ken Taylor

The beaches at Cape Hatteras National Seashore (above) remain virtually the same as always, except for a few footprints and tire marks. Wildlife is more abundant than one might expect, and most villages near the National Seashores, like Ocracoke (left), have retained their charm.

Ken Taylor

beach frontage. When the Seashore's land acquisition program is completed, it will include a total of about 63 miles of ocean beach frontage.

Like all national parks, these National Seashores are not without their share of problems. Almost all have one common cause: heavy use. At Cape Hatteras, especially, as in almost every other national park or national forest, visitor use has risen dramatically the past 10 years.

The hottest controversy on Cape Hatteras presently is over the use of off-road vehicles (ORV's).

In 1972, all federal land management agencies were mandated by the president to review the use of ORV's on their land. The Park Service drew up a plan for the Cape Hatteras National Seashore that kept 49 miles of beach open for year-round ORV use, and closed an additional 21 miles of beach between Memorial Day and Labor Day.

In May of 1977, another Presidential order was issued. President Carter ordered that all areas open to ORV use which are suffering adverse effects to soil, vegetation, wildlife and its habitat, and cultural and

historic resources, be closed to ORV use. The Park Service responded by drafting a proposed management plan which would have closed 37½ miles of beach to ORV use year-round, would have left 25 miles of beach open to ORV's year-round, and would have left another 11 miles of seashore open to ORV's from October 1 to April 30. Surf fishermen protested the proposed closing of such an extensive area, arguing that ORV's are essential to their sport. They also noted that surf fishing plays an important role on the region's economy, and pointed out that the Park Service had proposed to restrict ORV's without any hard scientific evidence to back up conclusions.

"The second plan we recently drafted limiting ORV use is just a proposal," Bill Harris, superintendent of the National Seashore commented. "Right now, we're working with the public to come up with a plan that's fair to everyone, but still maintains the quality of the environment. We're doing this through a series of public workshops and meetings."

According to Harris, ORV's have detrimental effects on wildlife. "We've seen a marked decrease in the number of maritime birds using beaches that are open to ORV's," said Harris. "Many of these birds nest on the beach, and the nests are very well camouflaged and are very susceptible to damage. These birds need solitude, and any human intrusion into their nesting areas will disrupt them. This includes foot travel, but ORV's are a particular problem. Ghost crabs also use beaches less when ORV's are present. We also think ORV's may increase beach erosion, but we don't have any proof to support that. We're also getting an increasing amount of pedestrian-vehicle conflicts."

Harris feels that ORV use will be limited in the future, and that they may eventually be banned from the National Seashore entirely.

Those who support ORV's do not object to reasonable restrictions, but say that erosion and beach change are continuous and natural processes which are unlikely to be influenced by tire tracks or footprints. Opponents also note that birds nest at specific times in specific places, but that these areas comprise a very small part of the total area proposed for closure.

"It's our feeling," said one ORV supporter, "that the integrity of the Park and its wildlife can be maintained without such major limitations on ORV use."

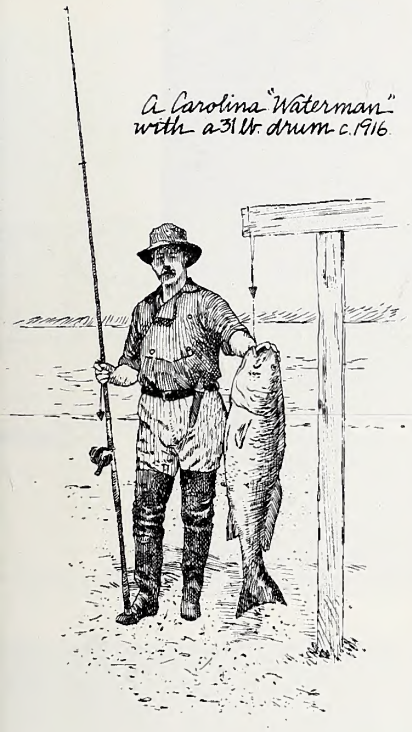
Harris offers possible solutions that may solve some of the problems in the future.

"There are several things we could do that would give surf fishermen mobility, while limiting ORV's," said Harris. "We could have some sort of public transportation system on the Seashore, which would give fishermen the mobility they need, and allow them to move up and down the beach with their gear. We also hope to build more public parking areas with access to the beach so fishermen will be able to park within walking distance of areas they'd like to fish. Another possibility is that someone may invent a vehicle that can be used on the beach without damaging the environment."

The Cape Lookout National Seashore is much more isolated than Cape Hatteras, but shares some of the same problems. Beach erosion is a particular problem at the Cape Lookout Lighthouse, where the entire historical complex surrounding the light may soon be engulfed by the sea.

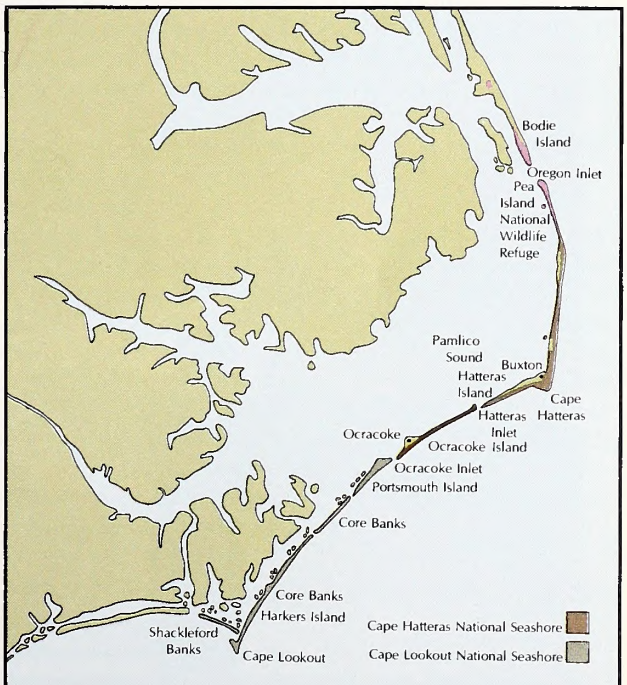
Ken Taylor

Travel and Tourism/Clay Nolen



Richard Jay Beckman

Hatteras Light (below, left) stands watch over vacationers and surf fishermen, but even under crowded conditions, there are quiet places where snow geese (above) can gather and feed. On Shackleford Banks in the Cape Lookout National Seashore, wild horses (left) wander through the dunes.

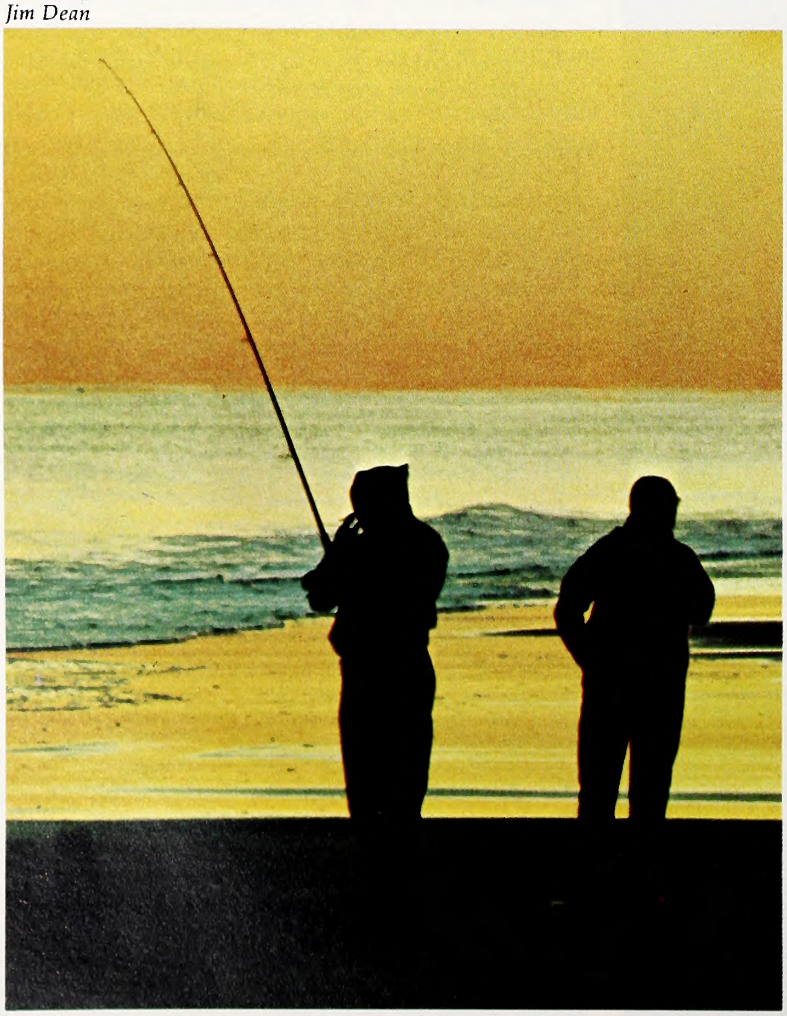


With 73 miles of beach in the Cape Hatteras National Seashore and 63 miles of beach in the Cape Lookout National Seashore, North Carolina holds claim to the largest unspoiled beaches left in the nation.

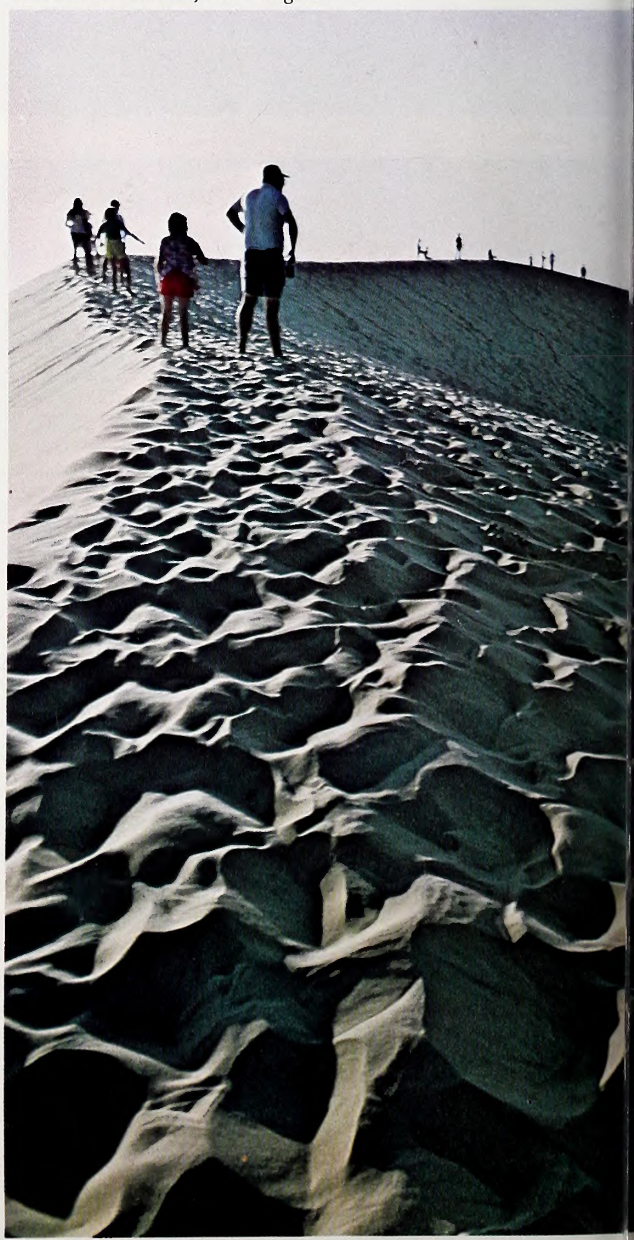
Jim Dean

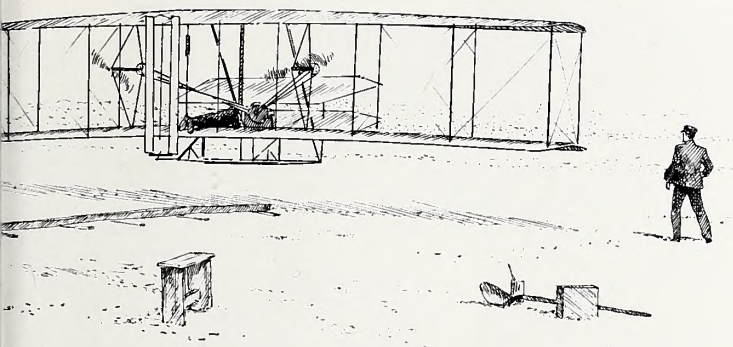
Surf fishing (above and below) is perhaps one of the most popular recreations within the two National Seashores. Hatteras Island, especially around the inlets or at Cape Point, is world famous for its quality surf fishing. Cape Lookout National Seashore is less well known, but surf fishing is also excellent there. Other recreations are popular, such as hang gliding from Jockey's Ridge (right), which is outside the Seashore nearby at Nags Head.

Jim Dean

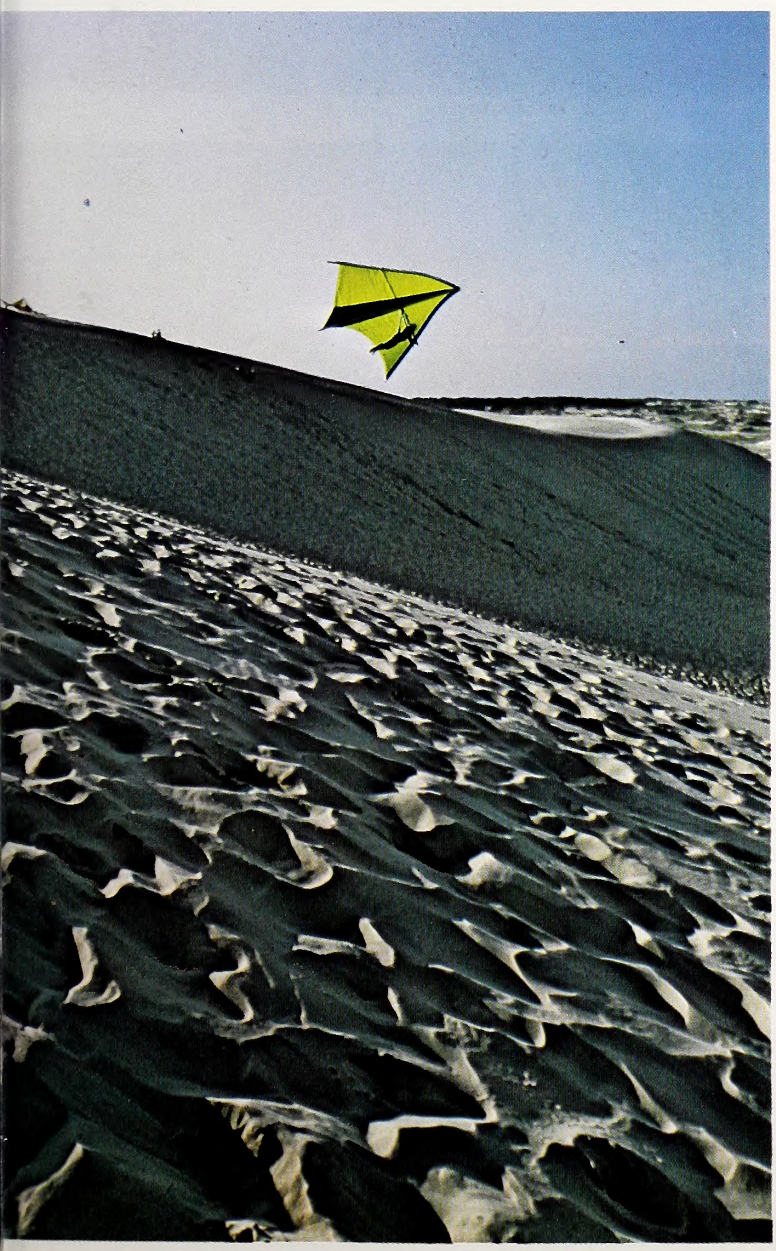


Travel and Tourism/Joel Arrington





The Wright Brothers, Kitty Hawk, N.C. c.1903



"We estimate that the Cape Lookout Lighthouse and the buildings around it could be lost completely within 12 to 18 months," said Preston 'Mack' Riddle, superintendent of the National Seashore. "There are two main causes for the erosion. One is that the Corps of Engineers is dredging the channel through nearby Barden's Inlet, and the other is the natural movement of the sand down the beach. In the last year, we've lost 35 lineal meters of beach here at the Cape, and since 1949, we've lost 1,000 lineal meters of beach around the lighthouse complex."

Junked cars on the beaches have also been a problem at Cape Lookout. Originally, the vehicles were brought over from the mainland and used as dune buggies by surf fishermen. As the vehicles wore out, they were abandoned on the beach. Well-meaning fishermen would group them into small piles, hoping that dunes would form over the abandoned wrecks, but their plans usually failed.

"The State of North Carolina is currently having a private contractor remove the abandoned vehicles," Riddle said. "The problem should be taken care of within a few months."

Although the National Seashores are a bonanza to fishermen and scenery lovers, there's a lot more to it than fish and surf. For the history buff, there are gold mines.

Starting at Kill Devil Hills is the Wright Brothers Memorial. It contains a museum, complete with a life-size reproduction of the Wright Brother's history-making airplane. In one of the memorial's outbuildings, you can also see a reconstruction of the "bachelor pad" the brothers lived in while performing their flight experiments.

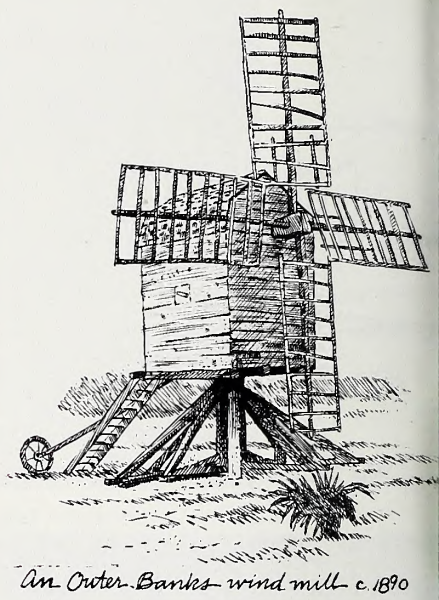
Visitors can also see the site of the first English colony in North America. In 1585, an unsuccessful attempt was made to settle on Roanoke Island. Two years later, in 1587, another attempt was made. The colonists disappeared without a trace, and no clue remains as to their fate.

"Our history program is very popular," said Tom Crowson, environmental education specialist for the National Seashore. "We've got three historic lighthouses in the National Seashore. Two are owned by the U.S. Coast Guard and the Cape Hatteras light near Buxton, which is open to visitors, is owned by the Park Service and operated by the Coast Guard. We have new shipwrecks surfacing and disappearing all the time, as the beaches erode or build up. As a matter of fact, we get a lot of flat tires on our vehicles from hitting spikes from shipwrecks that barely protrude above the sand. We have relatively few problems with our history program; some people try to walk off with pieces of our shipwrecks, but vandalism problems are relatively minor."

The National Seashores are also a haven for many types of wildlife.

"I've seen a whole crowd of fishermen watching otters play in a pool while the fish on the beach were hitting like crazy," said Clay Gifford, a resource management specialist for the Cape Hatteras National Seashore. "It takes a lot to get fishermen off the beach, but that will do it. Wildlife is one of the biggest drawing cards the National Seashore has, and there's a lot of it here."

Jim Dean



Like Hatteras, the Cape Lookout National Seashore also has a light (below) and the characteristic markings on this lighthouse are diamond shaped. Core Banks is part of the new National Seashore and is less developed; however, the removal of junked cars (right) has been a special problem. Storms (top, right) accelerate the dynamic character of the barrier islands, and the only absolute permanence is "change."

Travel and Tourism/Joel Arrington

Duncan Heron

Jim Dean

ink drawings by David Williams
reference material provided by State Archives and
the State Museum of Natural History.

Bird life is especially abundant. The Pea Island Wildlife Refuge on Hatteras Island hosts large numbers of migrating waterfowl at certain times of the year, while the refuge and the Seashore also serve as a haven for migrating shorebirds and water birds. The Pea Island Wildlife Refuge is part of the Cape Hatteras National Seashore, but it is owned and managed by the U.S. Fish and Wildlife Service. Incidentally, the refuge was once on Pea Island, but when an inlet closed in 1945, Pea Island became part of Hatteras Island. Life on the barrier beach is constantly changing.

"We've recorded 356 different species of birds here at the National Seashore," Gifford said. "Seventy-two of these sightings were incidental species which just happened to stray here. The Seashore is a major stopover point for migrating birds, which is why bird watching is so good here. If you draw a straight line from Florida to Maine, you'll find we're about 100 miles east of the general coastline. Since birds tend to follow the coastline when they're migrating, and since Cape Hatteras sticks out so far into the sea, they usually stop over here. It's important that we preserve the Seashore because it's vitally important to birds on the entire East Coast."

Studies done by the U.S. Fish and Wildlife Service show that there is less bird life using the beaches on the National Seashore now than in the past.

"The habitat for all types of bird life on the eastern seaboard is declining," Gifford said. "This has reflected itself in declining bird populations. This isn't any reflection on conditions here at Cape Hatteras. If we don't take some kind of action to preserve coastal habitat, sea bird populations will continue to decline. Birds that live on the beach, such as terns, sandpipers, some types of gulls, and others are especially vulnerable to coastal development. The small spoil islands located off our shores and in the sounds are especially important to these birds as nesting areas, and they must be protected. Any human interference in these areas, especially during the nesting season, can be enough to disrupt the birds."

There are several different peak times for bird watching, depending upon the types of birds. The peak time to see waterfowl is the dead of winter, starting about Thanksgiving and running until about the end of February. The best time to see wading birds, including egrets, herons, and cranes, is in the summer. Shorebirds abound at two peak times of the year, the first starts in late April and runs through the end of May and the second starts in mid-July and runs through October.

There are many other activities available at Cape Hatteras, including limited waterfowl hunting, a fish-with a-ranger program, nature walks and activities, just to name a few. For information on the Cape Hatteras National Seashore, write Box 675, Manteo, North Carolina 27954.

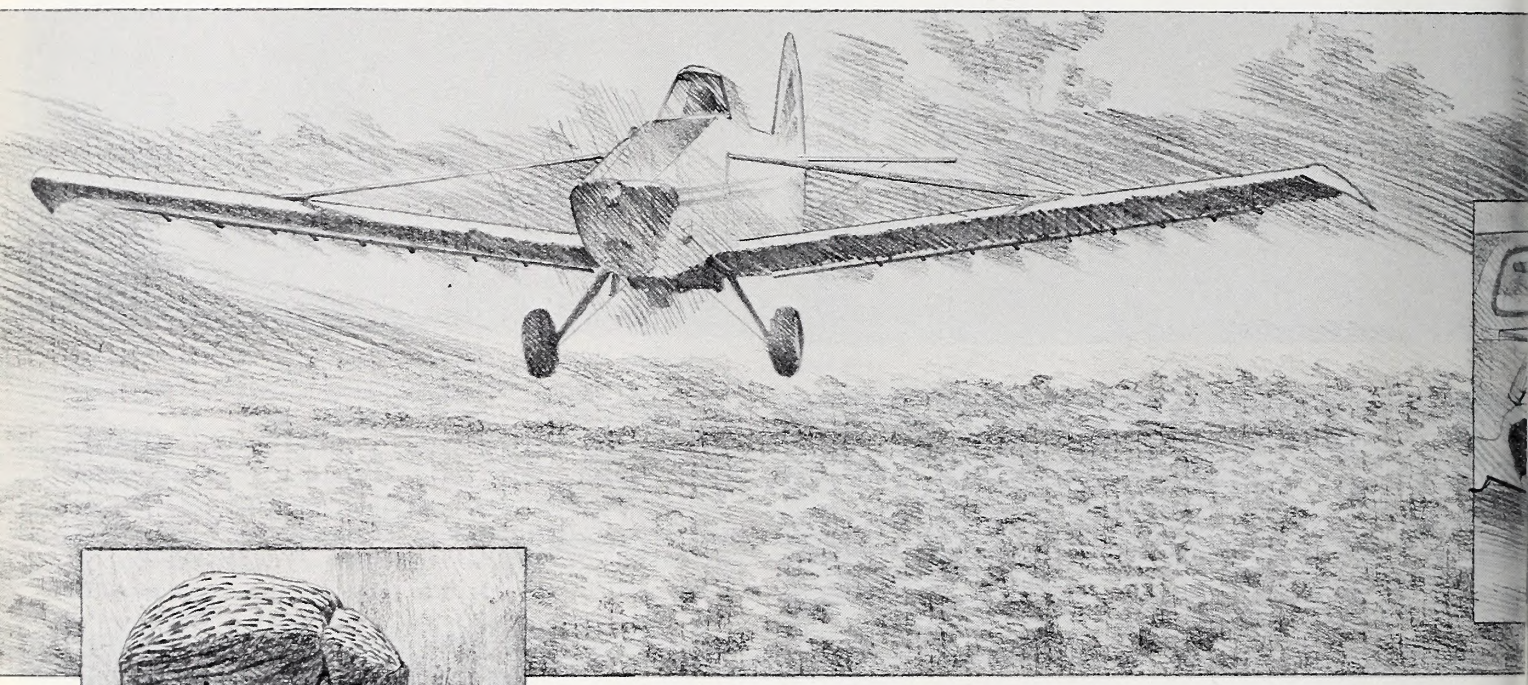
For information on the newest National Seashore, write to Cape Lookout National Seashore, P.O. Box 690, Beaufort, N.C. 28516.

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA, and director of the Wildlife Commission's news program.

The Invisible Poachers

By Rick Estes

Pesticides are big news today. These chemicals which kill unwanted insects, plants and all kinds of "varmints" have made their way into our gardens, our lawns, and the six o'clock news. Farmers, manufacturers, and housewives all have a stake in the future of these chemicals. Everybody's interested.



Rachel Carson really started all this interest in pesticides with her book, *Silent Spring*, way back in 1962.

In the first part of that book, she describes an idealized community with beautiful fields and forests, abundant wildlife and fertile farmlands. The streams flowed clear, the birds heralded spring with their songs, and all was well with Nature.

But this Utopia met its end because of the chemicals which rained down from the skies, percolated into the soil and water, and coated the leaves of all the plants. The animals sickened or died, the crops failed, the birds disappeared — a silent spring had arrived.

Rachel Carson's sad tale about this perfect place was a fable, but the balance of the book was fact — pesticides *can* bring disastrous results when overused or misused.

Many pesticides are being used in North Carolina today. Even though restrictions and safeguards have been placed on the sale and use of many pest-killing chemicals, an estimated total of nearly five million pounds of herbicides and insecticides each year are applied to the State's corn, cotton, soybean, sweet potato and tobacco crops.

For several years now, rabbit and quail hunters and biologists of the N.C. Wildlife Resources Commission have expressed concern over the apparent decline in the State's populations of both these popular game animals.

Based on these concerns and the current level of pesticide use in North Carolina, the question has been asked, "Are pesticides killing our rabbits and quail?"

In an effort to answer that question, a pilot study of rabbit and quail exposure to pesticides was undertaken by Dr. Tom Sanders, wildlife extension specialist at N.C. State University and Paul C. Smithson, a graduate assistant in the Department of Zoology.

Dr. Sanders emphasized that this was a small pilot study designed to answer some specific questions.

"The area which we chose for the study was a cotton-growing section of Scotland and Robeson counties consisting of about 500 acres of cotton," he said.

Even though cotton is not grown as extensively now as in previous years, it accounts for a disproportionately large percentage of the total insecticide use in the State.

Dr. Sanders pointed out that the landowner who volunteered his farm for the study had some good small game habitat around his fields, and he was concerned about what effect his pesticide applications might be having on the rabbits and quail which lived in his field borders.

"And his farm provided us with a relatively small, well-defined study area," Dr. Sanders said.

"First we wanted to determine whether rabbits and quail were actually being exposed to two pesticides, methyl parathion and toxaphene, that were applied by air," he explained.

"Even though we knew that the animals were in the area during spraying, no studies had been done to determine if they were actually taking up the pesticides."

Dr. Sanders explained that while much research has been done on wildlife exposure to pesticides, very little has been done in North

Carolina under actual field conditions.

The second objective of the study was to compare two methods used to measure pesticide exposure in animals. Dr. Sanders noted that some pesticides break down rapidly in the soil and in animal tissues, and their presence is very difficult to measure directly. In this case, methyl parathion exposure was determined by measuring the level of an enzyme which the pesticide blocks in the brain.

"The third objective was to determine whether any rabbit or quail deaths were caused by exposure to the two pesticides being used," he said.

During July, August, and September, 1976, the cotton fields received 11 applications of methyl parathion and toxaphene. The researchers made seven trips to the fields during this period to collect animals by shooting. They also set up transects, or search lines, and periodically searched for dead or dying animals. These searches were made before, during and one month after the spray period.

"We found that the rabbits and quail were, indeed, being exposed to the pesticides," Dr. Sanders said. "We found evidence of methyl parathion in about half of the 15 rabbits which we collected and in 11 of the 27 quail. Toxaphene was found in 13 of the 15 rabbits and in all the 27 quail sampled."

"However," Dr. Sanders pointed out, "we did not find any dead rabbits or quail on any of our trips to the fields, nor did we find any that were obviously suffering from the effects of pesticide exposure."

"But," he said, "it is important to note that the study only covered one spraying season, and that long range effects of the pesticides exposure were not determined."

This pilot research project points out the need for more far-reaching field studies dealing with small game exposure to pesticides.

"However, there are some recommendations which we should make regarding the use of pesticides today based on what we have learned," Dr. Sanders said.

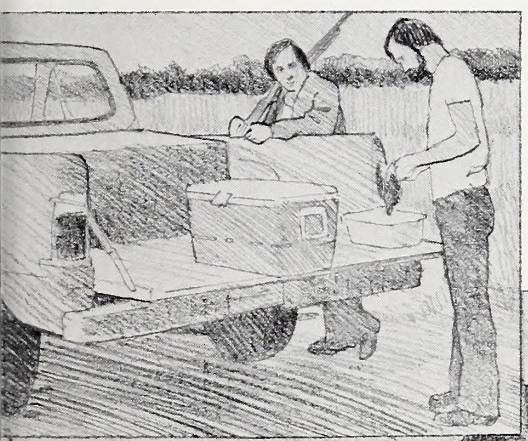
"First, reducing total pesticide use will benefit everyone — the farmer, sportsmen, wildlife, and the millions of citizens who are concerned about the quality of the environment."

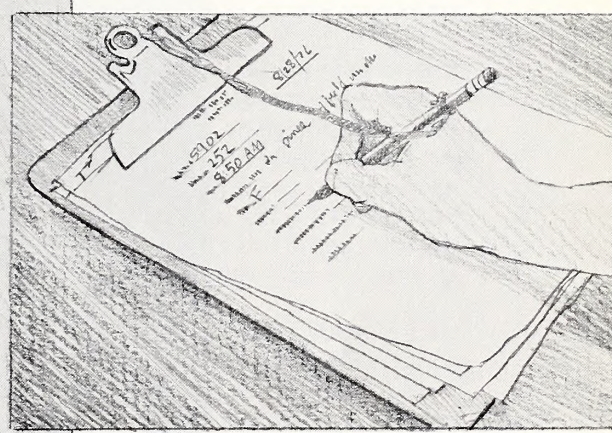
Safer methods must be found to control pests. It is important to know the situation in the field before pesticides are applied. How serious is the pest problem? How much pesticide is required?

Dr. Sanders explained that increased emphasis on pest control cooperatives and insect scouting programs can help minimize the need for full-scale application of pesticides.

"Of course, all pesticide users should be encouraged to use the smallest amount necessary and to follow the manufacturers' directions carefully," he said.

The method of application is also important, according to Dr. Sanders.





"Although aerial application offers the least exposure to the persons involved in application, it also has the greatest potential for spreading the chemicals in the wrong places. Wherever possible, other methods should be used."

"Finally, alternate means of pest control must be sought through research. This research can only be successful if it is supported by farmers, sportsmen and all who want a better environment for the pursuit of their legitimate interests." ⇕

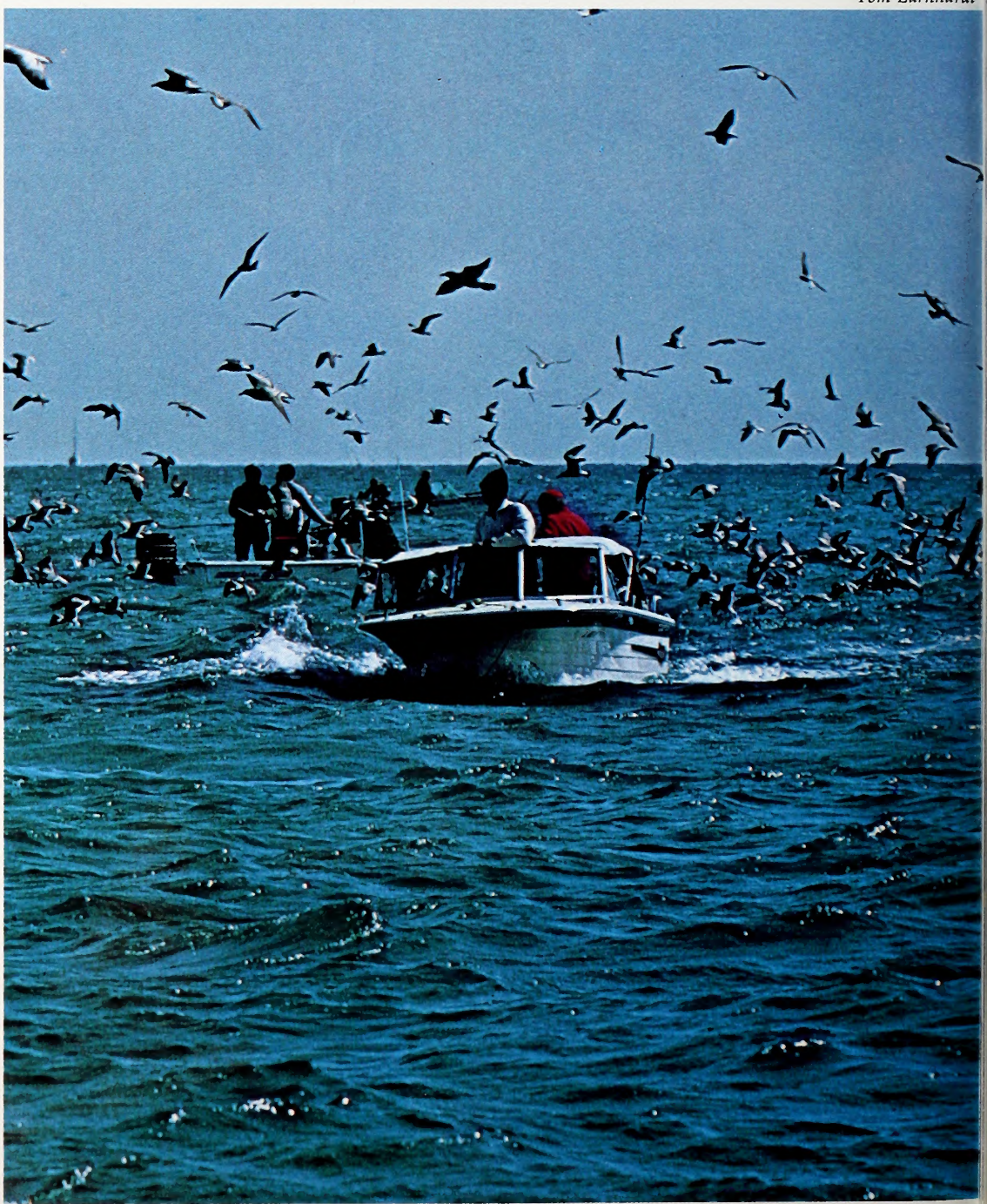
Rick Estes is the Piedmont regional representative for the Wildlife Commission's Division of Information and Education.

illustrated by David Williams

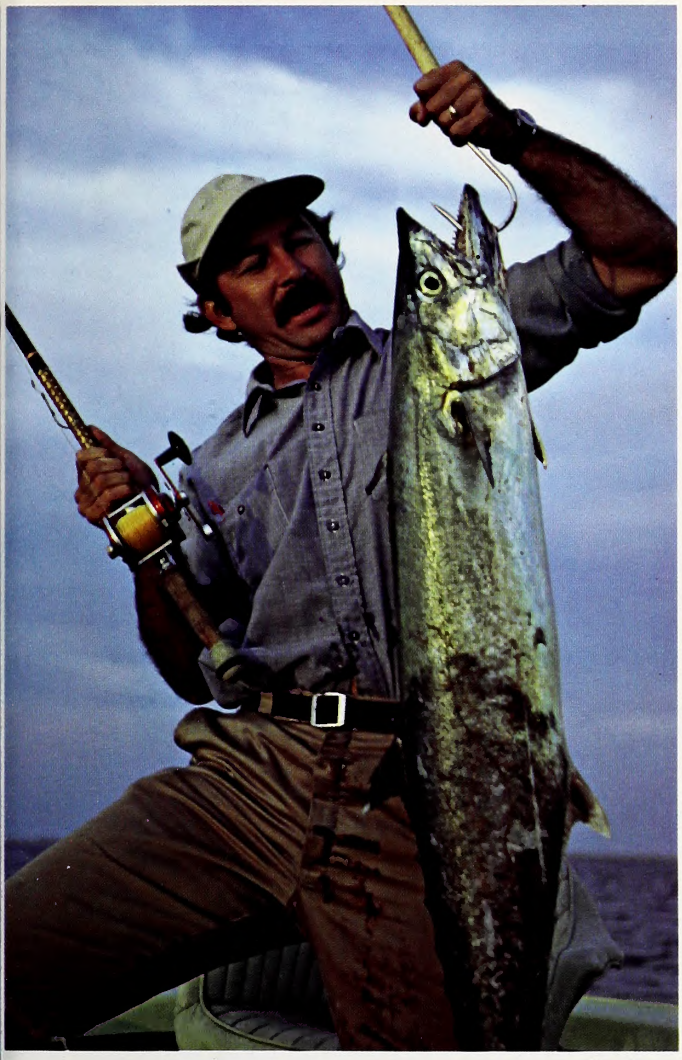
North Carolina's Inshore Angling Boom

Small, open boats have expanded the horizon for inshore salt water fishermen

Tom Earnhardt



By Tom Earnhardt



Jim Dean

Feeding bluefish (left) drive gulls into a feeding frenzy which also attracts fishermen. Joel Arrington hefts a nice king mackerel (above) which took a live bait. Gray trout are also popular with small boat fishermen (below).

Travel and Tourism/Joel Arrington

In eastern North Carolina few subjects spark greater debate than the age old question — "Who serves the best barbecue?" An old professor of mine from college days has a firmly etched grade in his mind (A, A-, B, B-, C. etc.) for every barbecue stop from Raleigh to the coast, and I am fully convinced that he has eaten at all of them. Other friends use less academic rating systems — usually a 1 to 10 with 10 being the highest. In the company of these individuals I have heard the merits of hickory versus oak, chunky versus chopped, dry versus moist (greasy), and Goldsboro "pig" versus Wilson "pig" debated *ad nauseam*.

I do not want to be quick to criticize, however, because several weekends every fall for the last dozen years I have been involved in another never-ending argument with good friends — "What are we going to fish for this weekend?" Having been a member of the small boat fraternity (15 to 24 feet) during this period of time, fishing partners and I often get into good natured squabbles about how and where our mini-yachts are going to be deployed on a particular weekend.

My dad, for example, despised float fishing ("not enough action!") for king mackerel and cobia, and I loved it. Drifting for flounder and gray trout or pitching plastic grubs for speckled trout in a marsh hole *was* salt water fishing for him. I have some friends who equate fall fishing with trolling for kings, Spanish and bluefish for an entire weekend. Other angling acquaintances look on their boats as a means to stock freezers with big fall run spots, croakers and grays found in abundance in Pamlico Sound and inshore waters. A few muscular friends love doing battle with sharks or big amberjack over inshore wrecks.

Just as there are numerous styles and types of barbecue, there are virtually unlimited angling opportunities available to the small boat angler on the North Carolina coast. My stomach can't handle some of the barbecue, but I have found that in proper doses almost *all* coastal fishing can be satisfying. And like my barbecue grading professor, I can't help but share with you a few of the small boat opportunities which I give an "A" grade.

The number of small seaworthy center console fishing boats on the coast has multiplied like bluefish in recent years. Also, hundreds of June through August pleasure/ski boats from Lake Norman, Kerr Reservoir and other lakes are turned into salt water sport fishing machines after Labor Day. The North Carolina Wildlife Resources Commission reports that there are now over 180,000 boats registered in North Carolina — the vast majority of which are small craft. New marinas and boat storage facilities have sprung up all along the coast.

Six years ago I float fished near the jetty at Cape Lookout and rarely saw more than half a dozen other boats rigged for float fishing, even on the most perfect fall weekends. During the past two seasons I have often seen up to a hundred boats in the same area. This story is the same almost everywhere, however. With the ever increasing competition for angling space in the "hot spots" such as the Neuse River entrance marker, Oregon Inlet bridge, Cape Lookout jetty, and the artificial reefs at Wrightsville Beach and Atlantic Beach, I have become convinced that the small boat angler can increase both his catch and angling pleasure by approach-

Tom Earnhardt

Twelve-year-old Glenn Sides of Richmond, Va. took this huge 84 and-a-half-pound cobia near Cape Lookout, while his father, Ronnie (in striped shirt), had to settle for a 53-pounder. The proud grandfather is the late Curley Sides. Jigging takes a variety of fish, like this fat croaker (right).

Tom Earnhardt

ing each weekend trip with *several* options in mind. He should also be willing to experiment.

A small boat gives the angler the mobility to locate and move with fish. Fall is a magic time of the year when fish movement along our coast reaches its greatest activity. King mackerel, Spanish mackerel, bonito, bluefish, cobia and many other fish begin to move south, feeding as they go. The inlets — Hatteras, Drum, Bardens, New River, Masonboro and the others — become great funnels through which flounder, croakers, trout, channel bass and other species pour out in the fall. This mass movement is often marked by great clouds of sea birds which pinpoint the activity by circling and diving for injured baitfish pushed up by feeding fish. In good weather a small boat can put you in the middle of the activity.

Before going to a couple of my favorite "A" rated opportunities, a few words about boats and equipment are in order. Coastal waters can be dangerous and boats which are too small (12- to 15-footers with low sides) *are better left at home*. Bad weather, and the wakes of larger craft, can make fishing uncomfortable in any boat and can make the use of very small boats especially hazardous.

life jackets, marine flares, and enough fuel capacity to get you out and back. (Please note that the Coast Guard imposes other safety requirements.)

To make your craft a "fishing boat" several other features should be added. First, for sound and inshore waters a depth sounder or recorder is most desirable in that it enables the angler to locate deep holes, drop-offs and structures which are likely to hold fish. When trolling or drifting it is easy to lose a "hot spot," but this problem can be remedied by carrying a plastic jug marker attached to a brick or old window weight with nylon cord. Just drop the marker when fish are found. A net and gaff, especially if you are going after large fish, are necessary unless you want to lose a lot of fish at the boat. Just as necessary is a "fish billy," a small bat or club, which is used to subdue large fish before bringing them into a small boat. A thrashing cobia, a toothy king or large blue should never be invited aboard before receiving a couple of whacks across the head.

If you plan on fishing away from shore or in remote areas, a radio, compass and chart are necessities. A CB or VHF radio is not only effective for summoning help, but can also help you find fish by putting you in touch with other anglers in the area.

Amberjacks are inhabitants of many wrecks along the coast, and anglers can reach some of these wrecks in relatively small boats. Tom Earnhardt hooked this fish (left) over a wreck. Both live bait and artificials like this heavy jig (below) take the hard-fighting amberjacks.

Tom Earnhardt

Travel and Tourism/Joel Arrington

Six years ago, Joel Arrington of Raleigh and I spent four October nights with a swarm of unfriendly mosquitoes at their home on Swan Island, which is a tiny speck of marsh near the mouth of the Neuse River in Pamlico Sound. The new outboard (brand name will not be given) on our boat began to rattle, and then stopped altogether. Although we were never in any danger and the fishing was excellent, we could have gotten a tow back to Vandemere much sooner if we had had a radio.

The compass can be your single most important piece of equipment. On large bodies of water it is easy to become disoriented, especially in times of poor visibility. Carry a compass and charts of the area you intend to fish and learn how to use them.

My favorite fall fishing has to be float fishing. From September through early November, a small boat can put you in big game country just a few hundred yards offshore. Float fishing is just a grown-up version of the way I learned to fish a farm pond with a brightly colored cork and worm dangling under it.

In float fishing, a live six-to 12-inch baitfish is suspended under a toy balloon (which pops on the strike) by five to eight feet of wire cable. (See diagram for one popular rig design). Big fall run king mackerel and cobia will sometimes stalk a baitfish several minutes before striking. On the strike, kings will often sky rocket out of the water 10 feet or more and then make a 150-yard run. On a good day, an angler can land five or more fish but many baits will be lost. Kings caught float fishing are usually larger than those caught trolling, with 20- to 30-pound fish being common and even 40-pounders are not a rarity. A conventional revolving spool reel or large spinning reel with a good drag and capacity for 250 yards or more of 15- to 30-pound test is adequate for any king or cobia you are likely to encounter.

Drags should be set light for the strike and tightened when setting the hook and playing the fish. Note that any reel used for float fishing should have a *metal* spool. Monofilament stretches 10 percent or more and when a king or other large fish has run off a couple of hundred yards of line, the stretched line reeled back on to the spool creates tremendous pressure which can crush a light spool. Most standard boat rods or eight-to nine-foot surf rods are adequate float fishing tools.

With two or more anglers in the boat, I usually put out three baits at distances of 15, 40 and 75 feet from the boat. Staggering the baits in this manner will reduce major tangles.

Favorite baits are bluefish, menhaden and pinfish in that order. Croakers, spots, gray trout and even hogfish are acceptable, but in my opinion none compares with a 10-inch snapper blue.

Catching your bait can be half the fun. Small bluefish can often be caught by trolling small spoons near the surf line or pitching a small Hopkin's or bucktail around a jetty or pilings. When I can't find bluefish, I usually resort to bottom rigs with shrimp and small hooks for pinfish, croakers and spots. If you don't have a live well in your boat, a plastic trash can will do fine. The live baits are hooked just under the dorsal fin with the single hook, and the treble is allowed to swing free to catch short strikers. (See diagram)

Although more kings are caught than any other species, a number of other great game fish are caught by floaters. Large cobia, spotted bonito, sharks and even an occasional tarpon are caught every fall. Schools of amberjack generally stay around the artificial reefs and inshore wrecks until the first cold weather. They

Travel and Tourism/Joel Arrington

Tom Earnhardt holds a good amberjack for California angler, Rex Gerlach. The fish was caught on 20-pound test line using spinning tackle over a wreck near Morehead City.

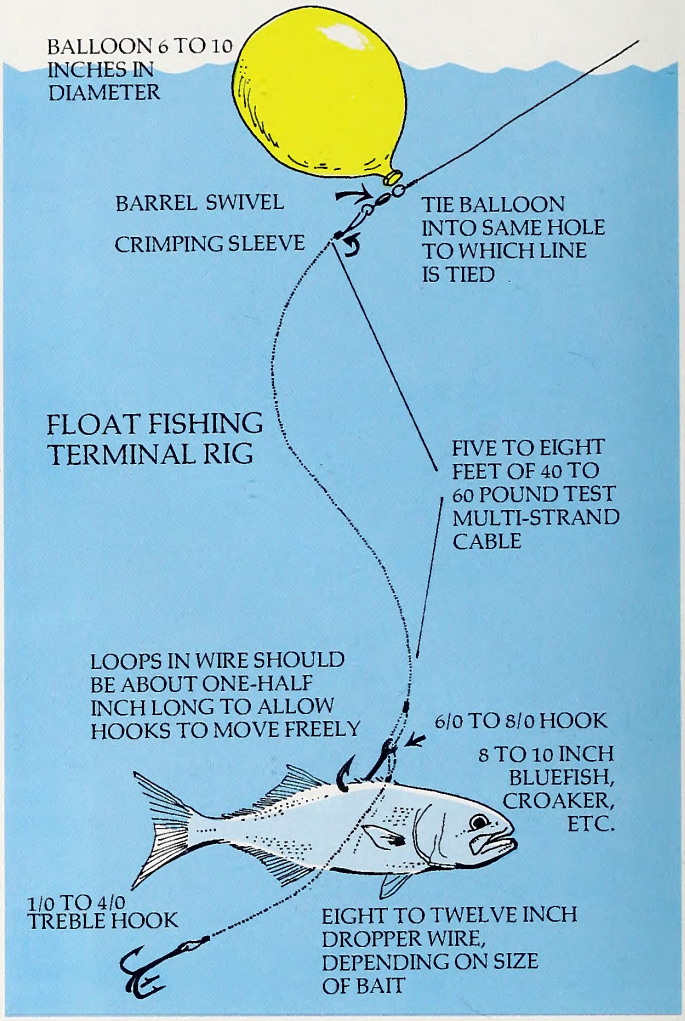
are suckers for a live baitfish. Since they will literally inhale even the largest offering, a treble dropper hook is not necessary. Float fishing can produce many surprises. Three years ago a seven-foot sailfish was caught near Cape Lookout on a croaker!

Channel markers, inshore wrecks, artificial reefs, jetties and deep water outside the major inlets are prime spots. Float fishing is an exciting sport and is one of the few ways that the small boat angler can get in on first rate, big game fishing.

As I indicated earlier, I find almost all coastal fishing appealing — plugging for speckled trout, drifting for flounder, light tackle trolling for Spanish, etc. However, in the past couple of years another favorite technique has proved to be very successful for several species of fish—jigging.

Jigging is relatively simple and can be done with spinning and conventional tackle. Using a Hopkin's lure, Lead Powell, Jerk Jigger, bucktail or heavy plastic grub, let the lure drop straight to the bottom while maintaining a tight line. In a quick upward movement raise the rod tip two or three feet on the upsweep and then quickly drop the rod tip to the water level letting the lure flutter to the bottom. The idea is to imitate an injured baitfish. Keep repeating this movement and allow the lure to touch the bottom with each drop of the rod tip. In heavy current you may have to go to a heavier lure and let out additional line to keep the bait on the bottom. Fish will normally strike as the bait flutters down.

The aspect of jigging I find so exciting is the variety of fish it produces whether you are fishing around bridge pilings, an inlet channel, holes in Pamlico Sound, over an inshore wreck or under a flock of feeding birds. The best depths are 15 to 40 feet; and although I anchor occasionally, I normally drift if winds aren't too bad. In



the same area I have often caught gray trout (a jigging favorite), large croakers, spots, speckled trout, bluefish, flounder and Spanish mackerel. Jigging is a pot luck sport because you never know whether your next jerk is going to be a pound gray or six-pound Spanish. Last summer an angler jigging for gray trout near Ocracoke with a Hopkins hooked and landed more than he had bargained for — a 60-pound tarpon.

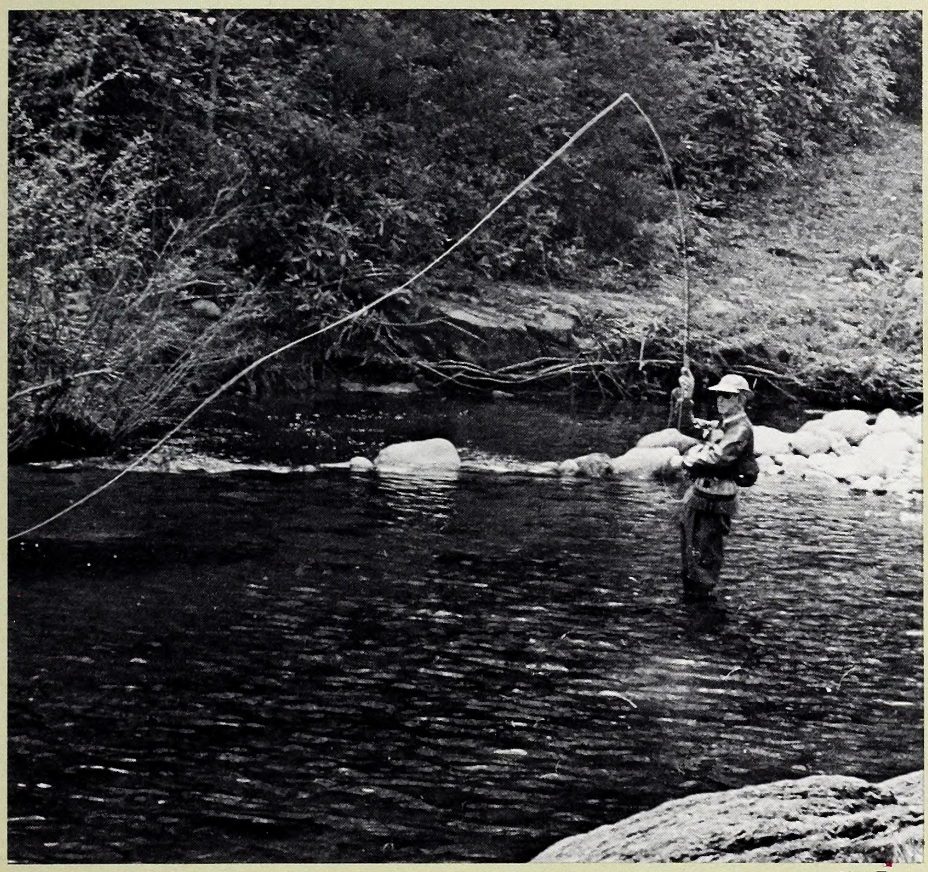
I have found jigging very productive under flocks of feeding birds. Small blues will often push bait to the surface. If you fish just the surface water you are apt to catch small blues, while 15 feet under the surface activity large gray trout, Spanish and even kings may be waiting to pounce on your jig as it flutters down through the surface confusion.

"Who serves the best barbecue . . .?" I am sure the argument will never end. "What to fish for this weekend . . .? I have my favorite fish and techniques, but I enjoy almost all coastal fishing. Your boat, or a friend's can open up more grade "A" opportunities than you ever thought possible . . . so why argue? ⏧

Tom Earnhardt of Raleigh is a graduate of Davidson College and UNC School of Law. He has fished extensively on the North Carolina coast and has written for several fishing publications.

Experiment May Improve Fishing!

"Fertilizing" Trout Streams



Jim Dean

The U.S. Forest Service, with the cooperation of members of the Land-of-Sky Trout Unlimited Chapter, are undertaking an experiment in the mountains of North Carolina which may solve a common problem with mountain trout streams — lack of nutrients — according to a recent article in the *Asheville Citizen-Times*.

The problem in most mountain trout streams in North Carolina is that the acidity of the water is very high. To counteract this, scientists have tried to fertilize the waters with lime — much as a farmer treats his field. The drawback is how to introduce lime into the water. The standard method is to install large water wheels containing drums full of lime, but the systems are expensive, hard to install and are a tempting target for vandals.

The Forest Service has decided to try a simpler approach. They are applying 200 tons of limestone gravel to a portion of the Avery Creek Road in the Pisgah National Forest and as the vehicular traffic abrades the gravel, small amounts are expected to wash down into Avery Creek with every rainfall. Trout Unlimited members will deliver water samples to Forest Service scientists at regular intervals. One key to the project is that the road must be very close to a river for this to work. Limestone travels through the soil very slowly and the amount that will reach the river is dependent upon direct runoff.

By reducing the acidity of the stream, the population of minute organisms will increase. In turn, the various nymphs, insects, crawfish and other forms of aquatic life that feed on these minute organisms will increase as their food supply grows, which will help trout populations by providing more feed.

— Mark Taylor

Green Swamp: National Landmark

Dear Sir:

I enjoyed very much reading about the Green Swamp in Michael Godfrey's article, "Plants That Kill To Eat." Your readers will be interested to learn that The Nature Conservancy, a private non-profit land conservation organization, received a gift of 13,850 acres of the Green Swamp in July, 1977, from Federal Paper Board Company. This generous gift from Federal Paper assures the preservation of one of North Carolina's eight National Natural Landmarks for this and future generations to enjoy.

Thomas M. Massengale,
Director
N.C. Nature Conservancy

June Enforcement Report

For the month of June, 1978, the N.C. Wildlife Resources Commission checked a total of 51,852 hunters and fishermen and 24,974 boaters.

Of the hunters and fishermen, 1,830 were prosecuted and 1,628 convictions were obtained. The total fines collected tallied $7,255 and the total costs collected were $38,953.

Of the boaters, 726 prosecutions were made and 656 convictions were obtained. Total fines collected were $1,335 and total costs collected were $15,544.

Other prosecutions totaled 39, with fines amounting to $585 and costs collected totaling $917.

All fines and any arrest or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the N.C. Wildlife Resources Commission or its personnel.

Cropland Erosion Double Acceptable Level

"I can remember seeing the dust storms come sweeping in from the west over Iowa when I was a kid back in the thirties," recalled Duane Raver, editor of WILDLIFE IN NORTH CAROLINA. "The sky would turn almost black as night in the middle of the day, and all of the cars would have to turn their headlights on. There was dust everywhere, and no way to keep it out."

Those who didn't live through the dust bowl of the 1930's cannot conceive of the damage it did. Following the dust bowl, farmers adopted agricultural methods that emphasized conserving the soil. But in the last few years, due to changes in agricultural practices and possibly the belief that "it couldn't happen again," soil erosion is once again a serious problem. According to the U.S. Soil Conservation Service, the annual soil loss on America's croplands averages eight to nine tons per acre, roughly double what is considered acceptable and North Carolina is no exception to the trend.

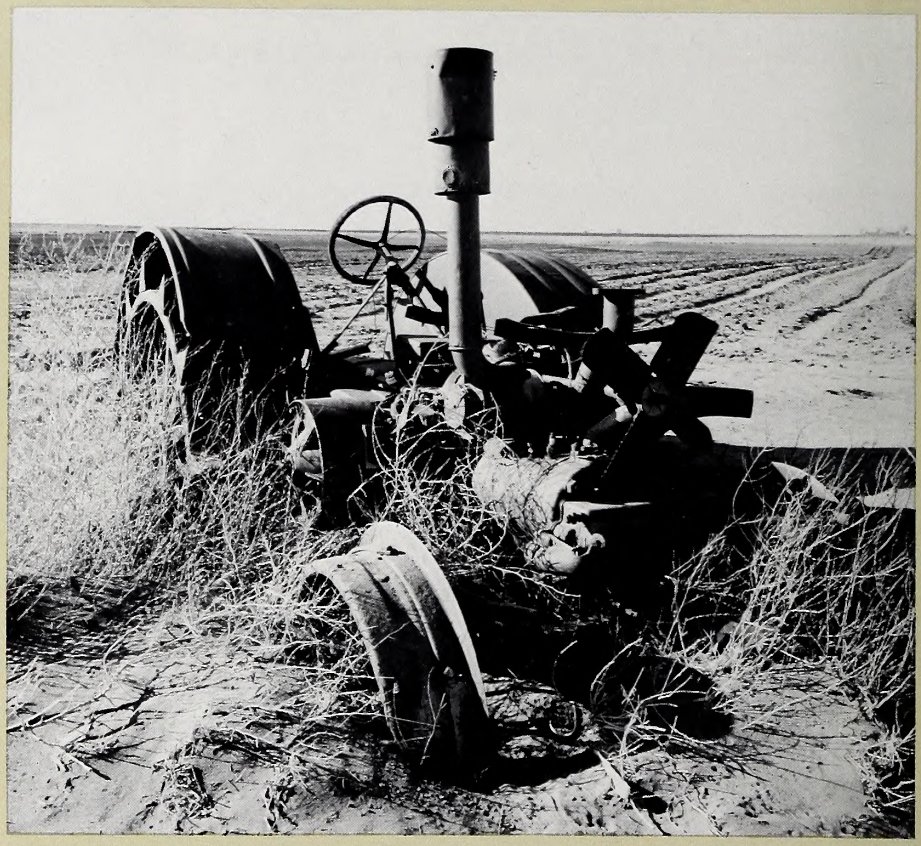
"Cropland in North Carolina averages an annual topsoil erosion loss of about seven tons per acre," commented Mitch Clary, assistant conservationist for the SCS in North Carolina. "What we would consider acceptable would be around four to five tons per acre, depending on the soil type. You can't lose more than five tons per acre without having a continual degradation of the soil resource."

According to the SCS officials, soil erosion is most severe in the Piedmont area of North Carolina with the Coastal Plain running second.

"Most of the soil erosion in the Piedmont is due to water erosion, while most of our soil loss in the Coastal Plain is due to wind erosion," Clary said.

Clary stated that even if wind erosion in the Coastal Plain got worse, there could never be a dust bowl there.

"The Coastal Plain gets an average of 50 inches of rain per year, while the states that had dust bowl conditions in the thirties got under 20 inches of rain per year," Clary said. "Without a complete change of climate, we couldn't have a dust bowl here. But we could have a serious wind erosion problem."



Soil Conservation Service

Most of America's croplands are losing eight to nine tons of topsoil per acre annually to erosion, roughly double the acceptable level, according to the U.S. Soil Conservation Service. North Carolina is no exception to the trend. This scene, which seems reminiscent of the dust bowl thirties, was photographed in March of 1976 a few miles west of Hugoton, Kansas.

President Carter has proposed that the budgets for the Agricultural Conservation Program (ACP) and the Great Plains Conservation Program (GPCP) be cut in half this year, according to the National Association of Conservation Districts. Under the proposed budget, the funds allotted for the ACP would go from $190 million to $100 million and the funding for the GPCP would go from $21.7 million to $8 million. These programs finance practices, on a cost-sharing basis, that help conserve the soil. Some of the practices include terracing, establishing permanent cover on marginal lands, preserving land as wildlife habitat, planting windbreaks and other measures. If the proposed cuts are made, the land will suffer both nationally and in North Carolina.

"If the money isn't available for these soil conservation practices, a lot of our soil is going to end up blowing away or washing down a river," said Bruno Mangum of the N.C. Agricultural Stabilization and Conservation Service. "In 1948, a lot of these programs were cut and farmers just didn't carry out the practices when they had to use their own money with no help from the government."

Conservationists are also worried about the impact of the proposed cuts on a local level.

"It's hard enough to get farmers to practice good conservation when the government helps by paying for part of it," said Doug Mier, a Soil Conservation Service agent for Wake County. "In Wake County, we usually get about $40,000 a year

as our ACP allotment. If that's cut in half, it won't go far spread among the 40 or so applicants we usually have. A lot of farmers aren't following the old conservation methods anymore. With larger farms and bigger equipment, farmers are plowing long, straight rows up and down hills without following the contours of the land. They also aren't terracing anymore because it's expensive and inconvenient to work equipment around. We're going to see a lot more soil erosion if people don't start following some of the old conservation practices."

While it may seem that what's going on in the Great Plains may not have any effect on North Carolina, that isn't the case. Farmers on the plains are going to bigger farms and are trying to put more land into production, as they are in North Carolina. One adverse side effect of this is the plains' farmers have drained many of the sloughs, small ponds, and marshes that are used as breeding areas by some waterfowl species. According to the U.S. Fish and Wildlife Service, in May, 1955, there were 7,303,000 of these breeding areas in the provinces of Manitoba, Alberta and Saskatchewan. In May of 1976, there were only 2,002,000 of these breeding areas in the same provinces. Most of them have been drained and put into agricultural production and the same trend holds true for the plains states below the international boundary. In the future, duck hunters throughout the United States and Canada will probably see fewer canvasback, teal, mallards, redheads, pintails and other types of waterfowl that breed in the prairies.

"Unless we act to minimize soil erosion, we'll be facing a lot of problems in the future," Clary concluded. "We'll not only lose valuable topsoil that takes hundreds of years to replace, but as the sediment moves into the rivers and streams, we're going to see a corresponding decrease in water quality. This will hurt wildlife and recreation, and we're also going to have severe gullying problems. Erosion is like a wound across the land that bleeds out raw red soil. It's not a pretty sight.

— Mark Taylor

There's good news for American commercial fishermen from the National Marine Fisheries Service. The newly enacted 200-mile fishing limit is working; and in 1977, 1,900 fewer foreign vessels were sighted working American waters than in 1976.

– Luther Partin

Sorry About That

Every now and then we fail to give photographers and artists credit for their work which appears in the magazine. One that we missed in the July, 1978, issue was the striking photo of the Brown Mountain Lights on the Natural Heritage page. Bruce Roberts took the photo, and our apologies to Bruce.

And then in addition to consistently adding an extra "k" to Karl Maslowski's name in connection with the photos on pages two and three of that issue, we credited him incorrectly on the page two photo and the top one on page three. Both of these fine shots should have been credited to Leonard Lee Rue. So, more apologies to both of these top-notch wildlife photographers.

Hunt-Fish Day Slated

National Hunting and Fishing Day will be celebrated this September 23. Clubs, organizations and companies interested in obtaining promotional material for the event may obtain either a packet for their organization or a "One-on-One" kit for individuals.

For materials write to National Hunting and Fishing Day, 1075 Post Road, Riverside, Connecticut 06878. The "Complete Organizational Packets" for clubs cost $5 and the "One-on'One" packet costs $2.

Artificial Reef Information Available

A new publication entitled, "How To Build A Freshwater Artificial Reef" is now available from the Sea Grant Program at the Virginia Polytechnical Institute and State University.

The booklet contains plans, construction tips, and instructions on how to build and locate artificial reefs.

Artificial reefs are often constructed of old automobile tires. They furnish cover and shelter for smaller bait fish, which attract larger game fish. Studies done by the authors of the publication indicate that fish living in artifical reefs grow faster and are healthier than fish not associated with reef structures.

Copies of the booklet are available for $1 by writing to the WPI&SU Processing Research and Extension Unit, Yvonne Holmes, Hampton, Virginia 23669.

Tide Tables for Rail Hunters

If you are planning a marsh hen hunt this season, this table of high tides should help in hitting the right times. Clip it for future reference. Listed are the high tides for Southport (Pivers Island and Shallotte Inlet are approximately the same). Add one hour to correct to Daylight Saving Time.

Sept.	Time (E.S.T.)	High Tide (ft.)
12	4:01 PM	5.0
13	5:03 PM	5.2
14	6:00 PM	5.4
15	6:52 PM	5.5
16	7:14 AM	5.3
16	7:43 PM	5.5
18	8:52 AM	5.4
19	9:38 AM	5.3
20	10:25 AM	5.0
Oct.		
3	8:17 AM	5.0
4	8:59 AM	5.0
5	9:41 AM	5.1
6	10:31 AM	5.0
11	3:45 PM	5.0
12	4:45 PM	5.1
13	5:41 PM	5.2
14	6:04 AM	5.2
14	6:32 PM	5.2
16	7:41 AM	5.5
16	8:07 PM	5.0
17	8:27 AM	5.5
18	9:09 AM	5.3
19	9:54 AM	5.1
31	7:12 AM	5.1
Nov.		
1	7:57 AM	5.3
2	8:43 AM	5.3
3	9:29 AM	5.3
4	10:21 AM	5.2

Fishing Reg. Hearings Set

Three public hearings on the proposed fishing regulations for 1979 are planned for the month of September.

On September 18, a public hearing will be held in Asheville at the courthouse at 7:30 p.m.

On September 19, a public hearing will be held in Salisbury at the courthouse at 7:30 p.m.

On September 20, a public meeting will be held in Greenville at the courthouse at 7:30 p.m.

Game Law Hearings Set

N.C. Conservation Law revision public hearings will be held at the following places: All are scheduled at 7:30 p.m. District 1: Chowan Co. Courthouse, Edenton, September 26. District 2: Craven Co. Courthouse, New Bern, September 27. District 4: 4-County Electric Membership, Elizabethtown, September 28. Other district meetings will be listed in next month's magazine.

Wildlife Federation Meeting

The North Carolina Wildlife Federation will hold its annual convention and awards program September 28, 29, and 30 at Raleigh's Hilton Inn. Governor Hunt will present the Federation's highest awards in conservation during the convention. A hearing on the game law revision will be held at 4:00 p.m. on September 29 at the Hilton Inn.

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Nature's Ways

The Flight Of The Monarch

Written and Illustrated by Duane Raver

It was the 28th of October and floating by my Raleigh office window some 60 feet above the city streets were dozens of orange and black butterflies. The annual migration of the monarch was in full swing, and had reached central North Carolina.

Many of the delicate insects travel well over 3,000 miles from the northern tier of states to their central Mexico wintering grounds. The western United States population of the monarch butterfly makes the trek to coastal California to escape winter's freezing temperatures. One butterfly that had been banded in a research project had traveled an average of 43 miles a day, about twice as fast as a man can walk. Some have been clocked at almost 30 miles per hour. Those that streamed by my window were likely headed for the colorful western North Carolina mountains, south to Florida and then some 600 miles over the eastern portion of the Gulf of Mexico to the Yucatan peninsula. Or perhaps their journey would be west to central Texas, ending in the Sierra Madre mountains of Mexico at an altitude of 10,000 feet.

Many would not make it for one reason or other. But enough would survive the flight, the chilly highland winter, and the early spring return trip to lay pinhead sized eggs the following summer and thus continue their kind.

Perhaps we will never know what triggers this urge to migrate and what guidance system is used to lead them over the miles. Is it length of day that initiates the southward trip, and then the mating process and the return flight the following spring? Is it the sun, magnetic fields, or what that pilots the monarchs through stormy skies? Perhaps it's enough to say that it is simply nature's way.

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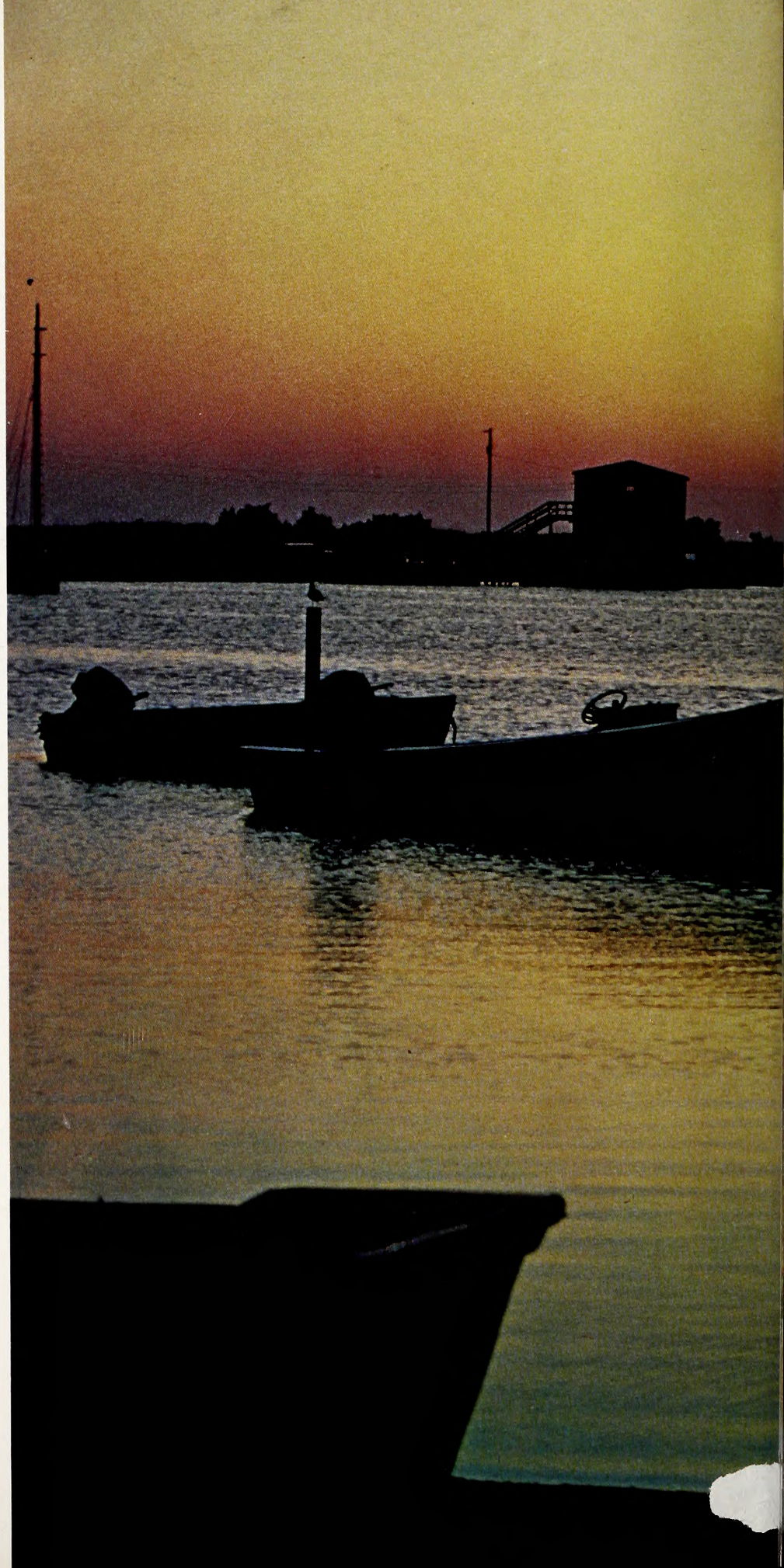

Ocracoke Evening

The sun sets across Silver Lake in the small fishing village of Ocracoke. Most of Ocracoke Island is in the Cape Hatteras National Seashore.

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by Jim Dean

How The Wild Boar Got Here

Joel Arrington/Travel & Tourism

In the mountains of western North Carolina, wild boar hunting has been a popular pastime since these European porkers were first stocked at Hooper Bald by Englishman George Gordon Moore shortly after the turn of the century.

"To know the nature of a wild boar, start with just plain hog. Then add a constitutional leanness, and the ability to run all day — fast. Add skill at gutting hounds, and willingness to charge a man, the fleetness of a deer, the cunning of a bear, and the elusiveness of a fox."

Thus did Emmet Gowen aptly describe the wild boar of the southern Appalachians in an article on boar hunting published in OUTDOOR LIFE in 1952.

Few who know anything about the wild boar would argue with Gowen, and because of these attributes, the boar has long been firmly entrenched as a prize big game species in Western North Carolina. Some hunters consider the wild boar a more worthy and dangerous adversary than the black bear, and dogs bred to pursue boars are necessarily a feisty lot. Will Orr, a boar hunter from Robbinsville, once stated his prescription for a good "hawg" dog.

"A hawg dog that won't fight ain't worth the powder and lead it takes to blow his brains out," said Orr. "I get mine to where I can sic them on to a hornet's nest, and watch them stand there and tear the nest apart and chomp live hornets while other hornets sting them all over. A hawg dog will do that if he's been brought up right and fed gunpowder."

In recent years, the existence of wild boar in many mountain counties has stirred up — if you'll pardon the expression — a hornet's nest of controversy. Basically, the conflict is over whether the wild boar should be eradicated — especially from the Great Smoky Mountains National Park — or retained and managed as a game animal.

Yet, despite the upsurge of interest in the wild boar in recent years, there are quite a few folks who still do not know the rather fascinating story of how these European porkers got to North Carolina in the first place.

Though no one is exactly sure, it is believed that the first European boar were brought to North Carolina in 1912 by an Englishman named George Gordon Moore. Moore reportedly was allowed to establish a private game preserve on 1,600 acres of timbered land surrounding Hooper Bald in Graham County as payment for his services as financial agent in a huge western North Carolina land deal involving an English firm, Whiting Manufacturing Company. Moore planned to use the preserve to entertain wealthy friends and encourage them to invest in companies he hoped to organize here and in Europe.

Large areas were fenced and in April, 1912, four buffalo and 14 European wild boar were brought to Murphy by Southern Railway Express. The boar were said to have come from the Ural Mountains in Russia, an area not unlike the Smokies. Interestingly, Moore is also reported to have obtained — in addition to buffalo and boar — 14 elk, six Colorado mule deer, some 200 wild turkeys, 10,000 ring-necked pheasant eggs, and 34 bears — nine of which were Russian brown bears while others were Canadian black bears.

Although there were problems from the beginning, Moore operated the preserve for about a decade. During that time, the boar herd had reached an estimated 60 to 100 animals. The others did poorly, although a few buffalo remained.

Partly from lack of interest, or perhaps for financial reasons, Moore finally turned operation of the preserve over to "Cotton" McGuire, a local boy who had been Moore's foreman.

Some of the boar had already escaped and they were breeding successfully in the wild. The rest soon stampeded through the fences during an attempt to thin their numbers. The elk were sold to various people and the State even bought 25 and stocked them on Mt. Mitchell, an effort that enjoyed brief success with eventual failure.

Then, in 1926, Champion Paper and Fiber Company bought 38,936 acres from Whiting Manufacturing, including the Hooper Bald tract. By that time, Russian boar populations were growing in Graham County and in nearby East Tennessee. Today, Hooper Bald is part of the Nantahala National Forest and boar are found over much of Western North Carolina.

Game experts estimate that the largest boar populations are in Graham, Cherokee, Clay, Macon and Swain counties, but they are found in other western counties also and have been reported as far east as Avery County.

While the National Park Service has expressed a desire to eliminate wild boar populations from the Park, many sportsmen and others — including the N.C. Wildlife Resources Commission — believe that the wild boar has become a valuable part of our natural heritage. For the time being, the matter is under study and no efforts are underway to eradicate boars.

Actually, the whole issue may be futile since most experts agree that boar populations are so widespread and firmly established that eradication would be impossible, even if efforts were limited just to the Park. Population control is possible through game management and regulated hunting, but any critter possessing "the fleetness of a deer, the cunning of a bear, and elusiveness of a fox" is not a prime candidate for extinction.

WILDLIFE IN NORTH CAROLINA

The official publication of the North Carolina Wildlife Resources Commission, Raleigh 27611. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

Volume 42, No. 10 *October, 1978*

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Front Cover *By Karl Maslowski*
The sight of a magnificent buck is always thrilling, and this photo won't run for cover like a live deer.

Back Cover *By Jim Dean*
Autumn's colors frame a mountain trout stream.

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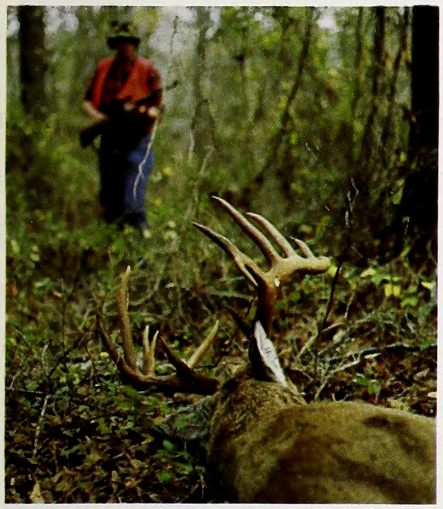
David Smart

North Carolina's White-tailed Deer



Steve Vaughn

North Carolina's whitetail deer herd has expanded drastically since about 1950, and deer are now more abundant and widespread than at any time in recorded history. Even so, the following articles show that there are differences in the population densities, habitat types, and management needs for deer herds in the east and those in the west. In the west, deer populations are still sparse in some areas, although management and restoration projects are having a positive impact. In parts of the east, the herds need thinning to ensure healthy, balanced populations.

The East

Driving east through the Coastal Plain in the late afternoon, it's not unusual to see deer moving into the edges of huge fields to feed. Even the most casual observer is likely to get the impression that there are a lot of deer in Eastern North Carolina.

True enough. In recent years, the white-tailed deer herd in the eastern part of the State has grown tremendously. Hunters and other wildlife enthusiasts are pleased, but some farmers are not so happy.

Indeed, the story of the rise of the deer herd in the East has been an interesting and complex saga. Perhaps even more important, however, is how we deal with this fantastically successful wildlife story in the future. To put it bluntly, things could go sour. In order to understand, let's look at a little history.

White-tailed deer in North Carolina and the rest of North America reached their all-time lows around 1920. Then following years of low numbers, the deer began making a tremendous comeback. Following World War II, ten million acres of farmland in the southeastern U.S. reverted to forest. Here in North Carolina extensive stocking efforts were undertaken. These factors, combined with public awareness and improved law enforcement which curtailed illegal hunting, proved beneficial to the deer and their numbers increased rapidly. So much in fact that in 1950 there were 15,000 deer killed legally in the State; during the years 1973 through 1977, the legal kill is estimated to have been somewhere around 40,000 annually.

"Most people underestimate the reproductive capabilities of deer," says Scott Osborne, biologist for the N.C. Wildlife Resources Commission, and principal investigator for a recently initiated northeastern deer study. "This combined with the memory of low deer populations and a massive campaign to limit doe hunting and you probably have grasped why many hunters are reluctant or adamant in their refusal to shoot does."

By Tim Hergenrader

Many studies show that deer do indeed have impressive reproductive capabilities. In Michigan, four does and two bucks were placed in a 1,200 acre enclosure. In six years, there were 160 deer. Another study in Worcester County, Maryland, revealed that in 15 years, from 1926 to 1941, deer increased from three bucks and three does to over 1,000 with an average annual increase of 37.7 percent.

Closer to home, the deer population on Open Grounds Farm in Carteret County last year was estimated to be around 1,800. Last hunting season approximately 1,000 deer were killed in the area in hopes of reducing the population and yet track counts, night surveys and other population estimating methods find deer numbers may be as high now as they have ever been.

Generally speaking, the deer herds in Eastern North Carolina are at or fast approaching the carrying capacity — the number of animals the habitat is capable of supporting. In some portions of coastal Carolina, deer are exceeding the land's ability to support them. Simply put, many areas "down east" have too many deer.

Most biologists, who are in the business of providing as much recreation and quality hunting for the hunters as possible, feel that hunters are under-utilizing the resources. They are not killing enough deer.

The goal of Osborne and his fellow biologists is to maximize hunter harvest of the deer and to minimize the losses to other factors such as illegal hunting, predators, disease and parasites. Presently, in many areas of Eastern North Carolina, this goal has not been realized.

And because deer in many areas are exceeding the carrying capacity of the land, the deer herd in some parts of Eastern North Carolina is in danger.

The danger is loss of deer to the other mortality factors that limit populations. Osborne says the present annual harvest could be jeopardized from one year of severe disease mortalities.

Accordingly, for the past few years, the Wildlife Resources Commission has been advocating either-sex deer seasons, the shooting of doe deer as well as bucks in those areas where studies have shown the deer are reaching dangerous levels. But, for various reasons, some hunters have resisted killing does, and figures show the deer herd is continuing to increase.

Therein lies the danger on the part of North Carolina's deer hunters. Deer are capable of and, all evidence indicates they are, overextending their numbers. When this situation exists, two critically important things happen. Deer begin suffering from population limiting diseases and the habitat they live in is altered.

"A biologist hopes the deer will be harvested by hunting before the habitat is damaged because the deer will replenish themselves; but if the habitat that supports those deer is harmed, it may never recover adequately to support a healthy deer herd," Osborne says.

"The bucks-only attitude of many hunters is actually detrimental to the health of deer herds."

Leonard Lee Rue

David Smart

The classic example of this occurred in the Kaibab Plateau of northern Arizona. There, in 1905, a game preserve was created and all hunting ceased except for predator control. Wolves, coyotes and mountain lions were all eliminated as controls on the deer herd. Originally, the carrying capacity of the area was estimated at around 30,000 deer. Deer numbers increased to nearly 100,000 and then the day of reckoning came. Deer numbers plummeted, reaching bottom at around 10,000 animals in 1930.

Because the deer had so severely altered the habitat, it was no longer capable of supporting the original carrying capacity of 30,000 deer. The new carrying capacity was 10,000 deer, a net decline of 20,000 deer. The habitat to this day has not recovered.

"I have seen some areas in the Southeast where you can't find any herbaceous plant reproduction at all; you can't even find a pine tree coming up because the deer browse it all," Osborne relates.

Osborne believes deer in many parts of Eastern North Carolina are exerting immense pressures on the native habitat. That is one reason why crop depredation is fast becoming a severe problem. Last year, at least 1,735

Steve Vaughn

That's a fine buck (above) and the hunters have every right to congratulate each other on bagging such a trophy. Even so, more does must be harvested in many parts of the State to maintain healthy populations and cut down on crop depredation. Big bucks like this one (opposite page) are products of balanced herds.

deer were killed by farmers protecting their crops, and this is considered a conservative estimate by most Commission employees.

Of course, large land clearing operations contribute to the problem also by destroying deer habitat which forces the deer to turn to agricultural crops in order to survive. It appears that deer prefer nutritious, heavily fertilized agricultural foods over those found in the woods. This brings up another problem. Many parts of the State have poor soils in comparison to other parts of the country, and agriculture may have artificially raised the carrying capacity. Crop depredation is a by-product of this artificially high population level.

What can the Wildlife Resources Commission and the State's sportsmen do? What is being done?

Basically there are three management options available. They are: setting seasons and bag limits to control deer numbers, and managing the habitat or manipulating the gene pool. One common method of manipulating the gene pool is accomplished by regulating harvest. To do this, hunters are encouraged to cull inferior animals, for example, spike bucks. According to Osborne, this probably would not work very well in North Carolina because the breeding season runs concurrently with the hunting season. Chances are that many inferior bucks will have bred prior to being harvested.

"Maintaining a good adult sex-ratio will take care of this aspect of deer management naturally. Genetically superior bucks will have an advantage over those inferior animals if the herd is in correct proportion," Osborne points out.

"Crop depredation by deer is fast becoming a severe problem down east. Last year, records show at least 1,735 deer were killed by farmers protecting their crops."

viable herd. Included are other considerations such as adult sex ratios, reproductive rates, fawn sex ratios and other population attributes that biologists spend years studying. Keeping all these aspects of a healthy herd in proper balance can be likened to fine tuning an automobile.

Studies have shown that from 30 to 35 percent of a deer herd can be harvested annually without damaging the herd if both sexes are harvested equally. Less than

Curtis Wooten

Habitat management in most cases is a viable alternative, but not so in Eastern North Carolina. Some work is being done; namely, chopping and burning to encourage new vegetative growth and food plot plantings, but it is limited.

"The problem with habitat management here is that the best soils are already being used for agricultural or timber purposes," said Osborne. "The remaining land is often not suited for wildlife management; therefore, habitat management for deer is incidental and is most commonly accomplished with other land uses."

Another important consideration is that habitat manipulation is undertaken to increase deer numbers, and there are already too many deer in most areas.

That leaves the setting of seasons and bag limits.

Osborne feels there is little that can be done to regulate buck harvest because with the long season, the heavy hunting pressure and the still prevalent bucks - only attitude of hunters, a large majority of the available bucks are being harvested. The only thing left is to harvest does and herein lies the crux of the matter.

Contrary to popular belief, the population of deer is not the only consideration in maintaining a healthy, 15 percent of the herd is harvested annually by shooting bucks only.

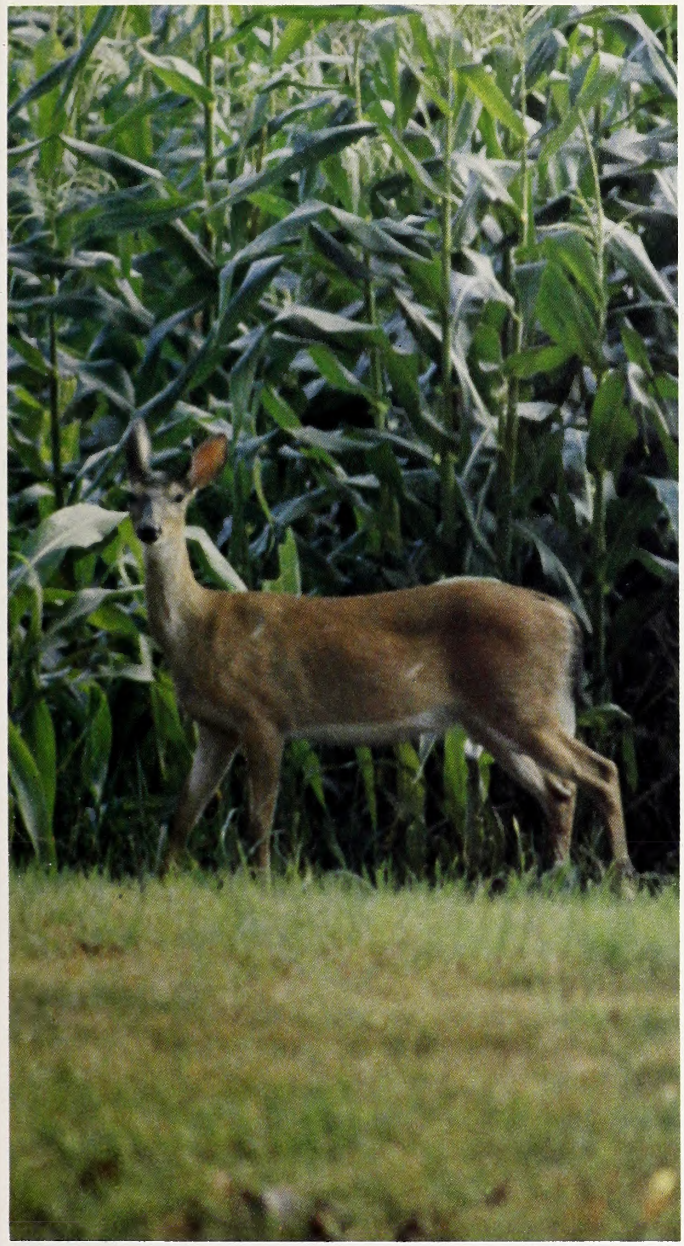
Osborne says that by shooting only bucks, hunters will eventually find fewer bucks for two related reasons. In any given area, the land will support only so many deer be they buck or doe. Shooting only bucks shifts the adult sex ratio toward the females. Also with buck hunting only, the population will continue to increase and at some point, reproduction may decline such that fewer bucks will be added to the deer herd annually.

Another purely selfish, pragmatic reason for shooting does is pointed out by a study in Wisconsin. Doe hunting there "increased the hunters" take-home venison by 250 percent and reduced illegal hunting by one-third in only one year."

So, the hunter says, "no I will not shoot does." What are the ramifications of this?

"The deer herd will continue to increase until the habitat is destroyed and/or disease and other mortality factors take over because you cannot stockpile these animals beyond the carrying capacity of the land over a period of time," Osborne explains.

Already disease has played out its grim part in the



Ken Taylor

Crop depredation is a serious problem in areas where deer populations are too high. This is especially true in the Coastal Plain where farmers legally kill several thousand deer each year. Wildlife personnel (left) check a field for crop depredation. Note the dead deer killed by farmer in background.

scheme of things. In 1939, epizootic hemorrhagic disease (EHD), a common killer of deer, laid waste to approximately 1,000 deer on Pisgah Game Lands. During two weeks in 1954, 500 deer were lost on Uwharrie. Other documented EHD outbreaks occurred more recently in Northampton, Montgomery, Alleghaney and Yancey counties.

Documenting cases of EHD outbreaks in Eastern North Carolina is difficult because it normally occurs during the summer when people are not in the woods and the mortalities probably go unnoticed. Furthermore, in the latter stages of the disease, the deer head toward water; and in Eastern North Carolina, that probably means swamps and bays where humans seldom tread expecially during the summer.

"I believe we are losing thousands of deer each year to other mortality agents because I know approximately how many deer are harvested annually and approximately how many deer there are. The balance is going somewhere and it is being lost to mortality factors other than legal hunting, factors we call compensatory," Osborne says.

Twentieth Century technology has caught up with wildlife management and a technique has been developed that helps biologists better evaluate the condition of a deer herd. Abomasal Parasite Count (APC), a technique that gives the game manager an index of the relationship of the deer herd to the carrying capacity, is being used extensively in North Carolina.

No fly-by-night scheme, it was 16 years in its development at the Southeastern Cooperative Wildlife Disease Study (SCWDS) in Athens, Georgia. APC, according to Tom Monschein, assistant supervising biologist in Eastern North Carolina, "is one of the quickest, most economical and reliable methods of managing deer we have."

Simple yet effective, the technique involves collecting five deer in a given location. Necropsies, postmortem examinations, are performed on the deer during which time body fats are used to evaluate the overall condition of the animals. The presence of lungworm, heartworm, liver flukes and other parasites are noted. The abomasum, or fourth stomach of the deer is removed and further tests are conducted in laboratories.

Under microscopes, small parasitic worms in the abomasum are counted, and the number of these worms is translated to "tangible evidence in numerical form" for presentation to the public.

Monschein explains the worms themselves do not kill the deer, but weaken the animals to other parasites and diseases. The numerical count of the worms gives the biologists an idea of the relative conditions of the herd as related to the habitat. As deer densities go up so do the number of worms.

Osborne feels the most important consideration of APC is it can be used in all areas of the State. "A worm count of 1,000 in Dare County means the same thing as a count of 1,000 in Northampton County."

This is very important, according to Osborne, because overpopulation can occur in a low density situation. For example, Dare County might have 20 deer per square mile while Northampton might have 60 deer per square mile. Yet, an APC figure of 1,000 for each indicates both are at carrying capacity and herd reduction should be implemented to maintain or reduce the herd.

The figures from the 1977 APC study indicate the herd in many areas of Eastern North Carolina needs reduction. To the discerning reader they also reveal something many hunters apparently fail to grasp. Many areas of the State simply will not support as many deer as other areas and nothing will alter the situation.

Biologists and other experts feel that the hunter has a choice in Eastern North Carolina. He can continue to shoot only bucks and run the risk of losing his deer hunting to disease and other factors; or he can shoot more does, increasing his take-home venison while maintaining healthy herds ensuring himself of future hunting. Rather like "having your cake and eating it too."

"Since 1974, 503 deer have been stocked on eight western areas, and plans have already been made to stock other areas."

Ken Taylor

The West

The screen door slammed loudly behind me as I stepped into the cool darkness of the old country store. I hesistated for a second as my eyes adjusted, then strode over to the old counter, scanned the rows of canned goods on the shelves behind the young salesgirl and asked for a can of beans and franks and a pack of saltines from the third shelf up. She reached to get them while I pulled a coke from the drink box. Pulling a crumpled bill from my pocket, I paid her, and with a "fisherman's lunch" in hand, strolled back outside where several men, young and old, sat enjoying the breeze and talking. That was back in August and it was sweltering hot in the sun. Yet, the topics of conversation were deer and deer hunting.

Now that's not particularly unusual for the North Carolina mountains, because deer and deer hunting have been popular topics of conversation wherever and whenever hunters meet here for the past couple of years. Undoubtedly, everything that can be said has been said about the status of the deer population in Western North Carolina. Some proclaim that the population has gone to pot, that there are practically no deer left in the woods. Others claim to have gotten their limit the past two or three seasons and have seen numerous deer and deer signs. Wherein lies the truth?

Have the deer been wiped out or are their numbers holding steady? Why don't we have the number of deer in Western North Carolina that are found in Eastern North Carolina or in Piedmont South Carolina? What is being done to increase deer numbers and expand their range in Western North Carolina and what does the future hold in store?

These are all good questions, and they certainly merit some kind of response.

Reports submitted by mountain hunters for the past two years show that the annual deer kill in the mountains is holding close to what it was during the late 1960's under the old management area system, for most counties, and is actually increasing in others. But we have to look closer to understand what is happening with deer in the mountains.

White-tailed deer were found throughout the Mountain Region when the first settlers arrived in the 1700's. Their numbers were relatively small, though, because the mature hardwood forests found here then did not offer a plentiful year-round food supply. The settlers hunted them mercilessly for their meat and hides, and by the late 1800's they had been practically eliminated from even the most remote regions of the mountains.

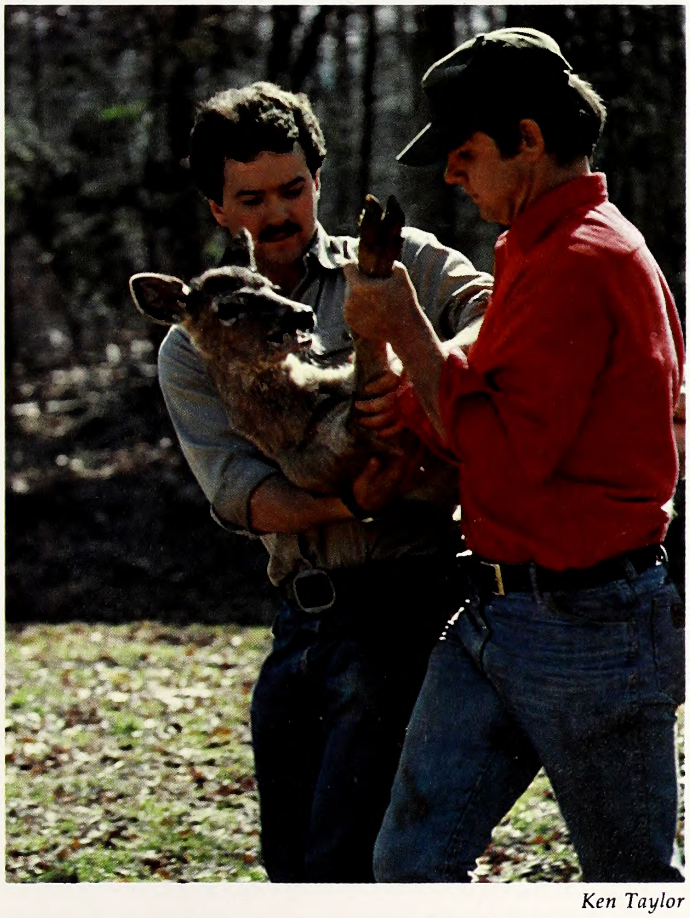
Between 1890 and 1900, the Vanderbilts brought in nine deer and stocked them on their estate in Buncombe County in the area that was to become the Pisgah Game Preserve, thus beginning the reintroduction of deer to mountain habitats.

Starting around 1927, the old State Division of Game and Fish, under the Department of Conservation and Development, began establishing a system of manage-

By Curtis Wooten

Ken Taylor

Deer restoration projects are currently underway, most in western North Carolina. Deer are live-trapped using a cannon net (left), then biologists check them carefully and transport them to the area under restoration (above and right). Most of the deer stocked on western restoration areas were live-trapped on Biltmore Estate.



Ken Taylor

ment areas throughout the Mountain Region on U.S. Forest Service lands and began stocking them with deer. Between 1927 and 1967, areas such as Mt. Mitchell, Wayah Bald, Daniel Boone, Standing Indian, Santeetlah, Fires Creek, Sherwood, Rich Laurel, Flat Top, South Mountains, Harmon Den, Panther Top, Green River, Thurmond Chatham, Blue Valley and Toxaway — all familiar names to mountain deer hunters — were stocked with deer. A total of 1,674 deer were released on these 16 areas during that 40-year period — most of them between 1927 and 1950.

Habitat improvement work, primarily in the form of controlled timber harvests, was done on the management areas to improve cover and food for deer and other wildlife. In the early years, predators and free-ranging dogs were controlled and, when the herds became established, strictly controlled hunting was allowed.

At the time, it was thought that the management areas would provide a nucleus deer herd which would expand and occupy other National Forest and private lands across the region. Some expansion did take place, but most of the U.S. Forest Service lands not in management areas, as well as most private lands, remained without deer. As a result, some two-thirds of the Forest Service lands, well over a half million acres, were largely being unused by deer hunters.

Consquently, most of the Mountain Region deer hunting effort was centered on the management areas. This caused a dangerous concentration of hunters, making for unsafe, and for some, unrewarding hunting conditions. Long lines in the predawn hours waiting to check in were common and late stragglers coming out at night were far from unusual. And it was expensive; $4 per day for the buck deer hunts, which worked out to $48 for the two-week season, if one wanted to hunt each day.

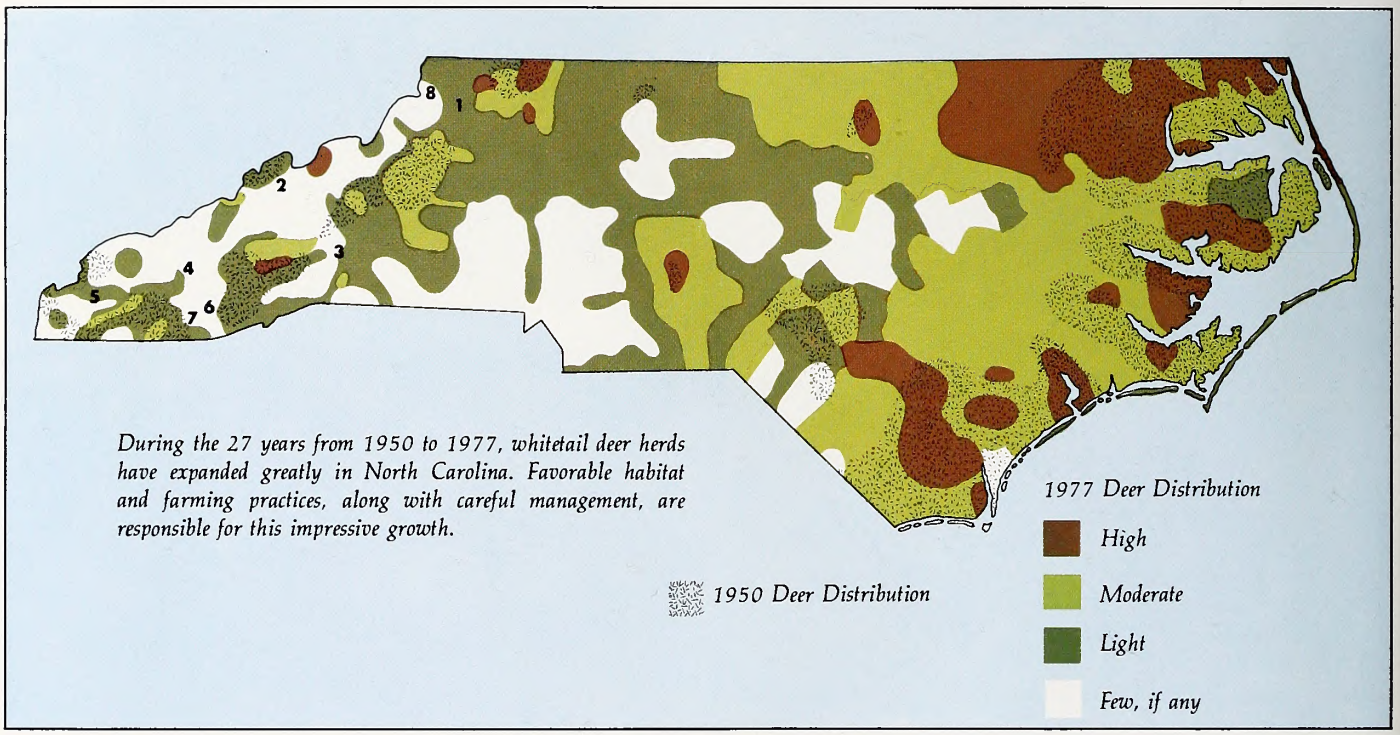
By the late 1960's, officials of the Wildlife Resources Commission and land managers with the U.S. Forest Service realized that the management area system had pretty much reached its potential for growth. They also

"Most areas in the mountains have only low to moderate deer populations at present, but there are areas in the mountains where deer are well established and may be reaching the carrying capacity of their habitat."

the game populations in the management areas. More and better deer hunting opportunities could be provided for sportsmen in the Mountain Region.

The opportunities offered by an expanded Game Lands program were too great to pass up and the current Game Lands system was organized.

As a result of this expansion, lands in the mountains being actively managed by the Wildlife Resources Commission to improve wildlife habitats and increase wildlife populations, and open to the public for hunting and fishing, increased from some 353,000 acres to over a million acres almost overnight in 1971. Of course there was, and still is, no magic formula for the instant establishment of huntable deer or other wildlife populations



During the 27 years from 1950 to 1977, whitetail deer herds have expanded greatly in North Carolina. Favorable habitat and farming practices, along with careful management, are responsible for this impressive growth.

Eight of North Carolina's 11 current deer restoration areas are in the mountains, and 476 deer have been stocked to date on these western areas, most of them live-trapped from Biltmore Estate.

1) — Bluff Mountain (Ashe County)
2) — Bluff Mountain (Madison County)
3) — Pisgah (Buncombe, McDowell counties)
4) — Cowee (Macon, Jackson, Swain counties)
5) — Snowbird (Graham, Cherokee counties)
6) — Upper French Broad (Transylvania, Jackson)
7) — Brush Creek, Yellow Mountain (Macon, Jackson)
8) — Elk Knob (Watauga, Ashe counties)

realized that hunting pressure on existing management areas and the demand for additional hunting lands was continuing to increase. They believed, however, that if deer and other big and small game populations could be established on all U.S. Forest Service lands — and there seemed to be no reason why this could not be done — more hunting opportunity could be provided, while decreasing hunter congestion and excessive pressure on in areas where they have been, in many cases, absent for nearly a century. Commission biologists began working even more closely than before with district rangers and staff officers of the U.S. Forest Service to inventory the new Game Lands and schedule habitat improvement projects. Game restoration planning was also begun.

Administrative changes were also made to improve management and protection efforts on the expanded Game Lands acreage. Additional biologists and wildlife management personnel were hired and allowed to concentrate on improving wildlife habitats in the region and to restoring and evaluating wildlife populations. Wildlife law enforcement activities were assumed entirely by the Division of Enforcement and 11 additional officers were employed and assigned to the mountains to take up the "slack" created by the removal of the resident managers from the old management areas. Another four officers have since been added in the west.

In 1973, 1974, and 1975, Commission biologists, technicians and enforcement officers gathered information on deer kills directly from hunters in the field on several of the old management areas, and from voluntary tagging and reporting. Those kill figures indicated

Ken Taylor

Although it was once uncommon to see deer in many parts of North Carolina a couple of decades ago, the population has grown and spread to record highs in some parts of the State in recent years.

harvests close to, and in some cases exceeding, the kill during the best years under the management area system — despite rumors that the deer population had declined.

In 1976, it became mandatory that hunters tag and report deer, as well as all other big game kills in North Carolina, making kill figures available for entire counties and the region for the first time. Those figures show that the deer harvest in 1976 and 1977 compares favorably with the harvest under the management area system and is beginning to show an increase in some areas, reflecting growth of the mountain deer herd.

In 1974, Commission biologists and technicians began livetrapping deer from private lands not open to public hunting (Biltmore Estate in Buncombe County, Roundabout Farms in Wilkes County and Roaring Gap in Alleghany County) and began relocating them to unoccupied, suitable deer range throughout the region. In the four years since then, 503 deer have been stocked on eight areas and plans have already been made to stock other areas as well. This is being done to fill in the gaps in occupied deer range, and to help control the deer herds on the private lands from which they were trapped.

According to Commission enforcement officers and biologists, much of the success of the deer restoration efforts depend on the amount of support received from local people in protecting the stocked deer, particularly from wild and free-ranging dogs. They can easily run down and kill does and fawns, particularly in the spring when the does are pregnant or the fawns are small.

Opportunistic poaching can also be a serious problem. During the first two to three years, the deer population on restoration areas is generally too small to make it worthwhile for the "professional" poacher to go out spotlighting. It's generally in areas with moderate to high deer populations that these people try to do their dirty work. But in low population density areas, it's the opportunistic poacher, who kills a deer while hunting squirrel, grouse, bear or other game or who kills deer feeding in roadside pastures, that does so much damage. A few deer lost to dogs, poachers and other factors, when there are only a few deer in the area, can set the growth of the herd back several years.

"Despite losses to dogs and other factors, we're beginning to see signs of expansion of the deer herd on restoration areas that were stocked only a couple of years ago and there has been a natural expansion of established herds into new areas," said Charles Hill, supervising wildlife biologist for the Northwestern Mountain Region. "As a result of that natural expansion, we're getting reports of kills during the hunting season in areas where there was no deer hunting even being done five years ago."

Hill says that while Commission personnel work to establish deer herds in new areas throughout the mountains, they also have to manage those herds that are already well established. "It's a paradox of sorts," he said. "On the one hand we are stocking deer to expand the herd in one portion of a county while, in another portion of the same county or possibly in an adjacent county, we may advocate limited either-sex deer hunting to maintain the health of the deer herd. To many deer hunters this may seem inconsistent, but we have

"Since most areas in Western North Carolina outside the old management areas have low to moderate deer herds, there is great potential for growth."

to treat the two types of areas as the separate populations they are until the restoration area populations catch up. In the meantime, we can't, in good conscience, let the health of those established populations decline since they have reached (and in some cases exceeded) the carrying capacity of their habitat."

"Some mountain deer hunters are misunderstanding us on this point," says A.E. Ammons, supervising wildlife biologist for the western mountain counties. "We recognize that we are nowhere near reaching our potential for numbers of deer in the Mountain Region — far from it. Most areas in the mountains have only low to moderate deer populations at present. But there are areas in the mountains where deer are well established and may be reaching the carrying capacity of their habitat. We are studying the deer in these areas closely, using techniques such as Abomasal Parasite Counts (APC), age-weight relationships, reproductive rates and other biological factors, as related to the availability of adequate food and cover, to determine the status and health of deer in these specific areas. Management recommendations, such as season length, bag limits and hunter choice seasons are based on information obtained from such studies.

Wildlife biologists say that if deer are allowed to exceed the carrying capacity of their habitat, both the deer and deer hunters eventually lose in several ways. First, a loss is realized in the size of the animals — their body weights steadily decrease as their numbers exceed the carrying capacity. Stimultaneously, a loss becomes evident in antler development. When the young, most nutritious foods have been eaten and eliminated from the deer's diet, there aren't sufficient nutrients available to develop the large, well-formed antlers they are capable of producing. Third, and most importantly, there is a significant decrease in reproduction. Research has shown that as the health of the females deteriorates, due to competition for food and living space, reproduction sometimes drops from an average of 1.5 fawns per doe (half the does have twins) to .25 fawns per doe (only one doe out of four has a fawn).

Then, too, there is the chance — probability actually — of a fourth type of loss which, if it occurs, is often catastrophic. When deer are crowded and food is in short supply, they are much more susceptible to disease epidemics.

Some diseases can, and often do, wipe out virtually entire populations. Epizootic Hemorrhagic Disease (EHD) is one that has struck in North Carolina with devastating effects in the past. Outbreaks of EHD occurred in parts of Henderson, Rutherford, McDowell, Burke and Caldwell counties in the late summer of 1975. Over 150 deer are known to have died of the disease then. That was likely only a drop in the bucket compared to the actual kill. You won't have such disease outbreaks where deer populations are truly poor.

Many people compare the Western North Carolina deer herd with the deer herds in Eastern North Carolina and Piedmont South Carolina. They ask why there aren't as many deer here as in those regions. But it really isn't possible to compare the North Carolina mountain region with those areas. It's sort of like comparing peaches and nectarines — one is missing something. The problem lies in the vast differences in the topography, habitat and land use patterns of the area — making considerable differences in the carrying capacity of the land for deer.

Eastern North Carolina and Piedmont South Carolina have a longer growing season than our Mountain Region and consequently a shorter overwintering period when green vegetation is not available to deer. High rainfall and warm to hot temperatures also create near ideal situations for dense, low-growing browse. Then too, vast acreages of the best deer range in the east are on the corporate forests of Weyerhaeuser, International and other paper companies. Those forest lands are managed on a short rotation schedule and hundreds of acres are cut in small blocks at one time, creating tremendous amounts of nutritious browse and cover. These factors, combined with the supplemental foods made available by patchwork agricultural practices, give the region a higher carrying capacity for deer than the Mountain Region. Also, the hunting rights on much of the lands in Eastern North Carolina are leased to private hunting clubs, which police their own ranks and prosecute those who violate club rules and game regulations, and they work closely with their wildlife enforcement officers to apprehend and convict poachers and other violators.

There is much room for improvement in Western North Carolina in these last areas. Indeed, such factors could well be the key to getting our western deer herd "off the ground."

Since most areas in Western North Carolina, outside the old management areas, have low to moderate deer herds at present, there is great potential for growth. In 1977, 2,501 deer were reported killed by deer hunters in the Mountain Region, or about one for every three square miles of forested deer range. But, if established herds stay healthy and budding herds on new areas continue to grow, mountain deer hunters can reasonably expect a sustained annual harvest of at least one deer per square mile of forested range, or some 7,500 deer. Wildlife biologists say that most mountain habitats can eventually support a harvest of at least two deer per square mile of forested range, or some 15,000 deer annually in Western North Carolina.

The Western North Carolina deer herd isn't as good as it could be, but it isn't in nearly as bad shape as some would have you believe, either. The combined efforts of Western North Carolina sportsmen, working with Wildlife Commission enforcement officers and biologists, can make the region progress a long way toward reaching its potential in the next few years.

Tim Hergenrader is eastern field representative for the N.C. Wildlife Resources Commission's Division of Information and Education.

Curtis Wooten is western field representative for the N.C. Wildlife Resources Commission's Division of Information and Education.

Trimming The Odds On Whitetails

What you do before the deer season is important. Planning and scouting are the keys to success.

By Mark Taylor

November, 1976 — The pond didn't look like much, but I thought I'd check it out for the next year's fishing season. I shifted the shotgun to my other hand, and poked through the bush. Suddenly, out from under my feet, a doe deer erupted. By the time the gun reached my shoulder, the critter had cleared the brush and was out of sight, headed for the end of the point.

"Swannee to the left, Dave to the right," I yelled in my best military manner. The other two guys fanned out beside me and were soon in position.

"Okay, we've got it surrounded," I hollered. "Now charge!"

No Marines ever hit a beach in the South Pacific with more determination than I had when I hit that point on the little no-name pond. Steely eyed, with gun in hand, I was the picture of resolution, grit and determination as I forded ditches, tore through the puckerbush and even got my feet wet while pursuing my rendezvous with destiny in the form of that four-footed critter. We all reached the end of the point at about the same time, and watched the deer, only 10 feet away, swim for the distant, opposite shore.

"Trouble was, you boys met up with a deep-sea deer," a lounger at the local general store cackled later after having been tipped off by some stoolie. "Next time, go fer one of the landlocked ones."

I didn't think it was funny.

The deer is, to say the least, a beguiling critter. And a popular one, for it is this country's most sought after big game animal.

Every year deer manage to make fools of thousands of hunters across this country, myself included. Yet while the deer is a challenging animal to hunt, there are ways to increase your chances of success considerably. If many hunters studied the deer prior to the season, they'd do much better. Yet many insist on simply blundering into the woods on opening day, and hoping for the best.

The first rule of the successful deer hunter is "ya gotta know the territory." Take some time and scout out the area before you hunt. A little preseason scouting will show the hunter how many deer are in the area, where they usually bed down and feed and what spots offer the best chances for success. Had I done a little preseason scouting around the pickerel pond I was checking out, I would have realized that deer bed down near its edges regularly and I might have bagged my deep-sea deer.

A few of the things to look for are tracks, rubs, and signs of browsing. Tracks are not necessarily a good indication of how many deer are in an area because one deer can make a lot of tracks. But by following deer trails and finding rub marks, which usually lead from feeding areas to the spots where deer bed down, you can get a good idea of where the deer usually move. It also pays to find out where the fields are and where patches of woods form natural funnels between fields. A topographic map can be a great aid to hunters by showing where these natural features are and by helping the hunter plan his strategy. A good hunter uses these maps the same way a good fisherman uses charts showing lake depths.

Some hunters also use aerial photographs to help them learn the lay of the land and one very

successful hunter that I know will occasionally rent a plane and fly over an area he plans to hunt.

In addition to knowing the territory, it also behooves the hunter to know a good deal about the white-tailed deer. Like all animals, including man, the deer is a creature of habit. The hunter who understands these habits is way ahead of the game.

Deer generally move and bed down in a regular cycle. In the early morning at about daybreak, the deer will usually come out into the fields to feed or begin to feed in the forest. They then bed down, and will feed again about noontime. After that, they'll bed down again and will come out to feed around sunset. Then they won't feed again until about midnight. At daybreak, the cycle will start all over.

By knowing where the deer feed, where they bed down, and at approximately what times they do these things, the hunter can plan his hunt.

For still-hunters, one of the most productive ways to hunt is from a tree stand. The stand should be located at least 10- to 12-feet from the ground or more, depending on the cover and should usually overlook a deer's route from its bedding area to its feeding area. Be careful to avoid placing the stand against an open background where your profile will stand out. It's best to have a good treeline behind you to break up your profile.

Once the hunter has picked the spot for his stand, he should take care in how he approaches it. Any animal, including deer, will be reluctant to cross the trail of a man, so it's best to approach your stand from a direction that doesn't cross the deer's regular route. The stand should be located downwind from the deer's projected route.

Once in the stand, it's just a matter of biding your time and being patient. If you hope to get a big buck instead of hunting for the pot, then you'll have to alter your tactics. The habits of big bucks differ from those of smaller deer. That's how they got to be big bucks in the first place. For starters, they're much more cautious than smaller deer. When deer enter a field, the big bucks will hang back until they're convinced the area is safe. So the hunter that bags the first buck in the field will probably never take a large one. Going for the big bucks means being willing to pass

up some smaller ones.

The techniques used in still-hunting are basically the same for the rifle hunter, the bowhunter or the muzzleloader. Bowhunters and muzzleloaders are limited to one shot, so they will usually have to wait for their best opportunity, which means a clear, short-range shot. Patience is the byword in these two challenging sports.

There have been countless thousands of pages written arguing about the best gun for deer, so I'm not going to add my two cents worth. As long as the gun is large enough to take a deer, it doesn't really matter what you use. What does matter is that you know how to use it, which means practice. If you only shoot your gun or bow or muzzleloader once a year, and then at a deer, you're putting yourself at a tremendous disadvantage. And if all your target shooting is done from a bench, you're also hurting yourself. Practice your shooting and when you

painting by Bob Binks / drawings by David Williams

practice, try and set up some typical shots that you'd get in the field. Many bowhunters do a lot of their practice shooting at targets from tree stands.

Once you've seen your deer, the next problem is taking your shot. The safest shot is the lung shot. The lungs occupy an area about the size of a basketball directly to the rear of the front shoulder. If you shoot high, there's a good chance you'll break the spine which is fatal. A low shot will often hit the heart, a shot too far to the rear will destroy the liver, and a shot too far forward will usually bust the spine, so there's room for considerable latitude while having a good chance of scoring a quick kill. The head shot, heart shot and throat shot will also prove fatal; but in each of these cases, you're shooting at a mighty small area, and a miss of a few inches will often result in a wounded animal.

Of course, still-hunting is not the only way to go for deer. One of the other successful methods is the deer drive.

November, 1977: I could hear the crashing ahead of me, but couldn't see what was making the commotion. Swannee worked below me, just barely in sight, about 20 yards up from the edge of the pond. I was halfway up the ridge, walking parallel to it. Four shots rang out ahead. At last, I thought, we've scored.

When we stepped out of the woods, I saw Dave and John standing in front of the pickup truck parked halfway up the hill on the logging road.

"Where's the deer?" I asked.

"That way," said Dave, waving in the general direction of the mountains out yonder. "We figured we'd save time on the way in, so we parked the truck between us up here instead of down at the bottom of the hill. That old whitetail just sashayed right out in front of it, so I couldn't shoot without bagging a buck and a truck. Of course, we still should have got it," he concluded, glaring at John.

John just stood there wearing a sheepish grin and scuffed around a little pile of dirt with his boot.

"When John heard that crashing in the woods, he just figured it had to be you," said Dave, "so he figured he'd answer the call of the wild. Leaned his gun against the tree, then walked into the woods 30 feet cuz he was modest. The old whitetail strolled right between him and his gun, while he was trying to get his belt buckled."

Even at the time, I couldn't get mad at John for leaving his place on the stand. Disappointed, yes, but I still thought it was funny. Which brings me to the point of this true tale of high adventure, the key to running a successful deer drive is organization.

A deer drive can be run with as few as two people. Some states — but not North Carolina — allow only a maximum of six hunters on a drive primarily for safety reasons. Deer drives can be a very successful method of hunting; but it's no place for someone who's trigger happy, and it's a good place to wear lots of blaze orange clothing.

Not all areas lend themselves to deer drives. All too often, hunters will try to stage a drive over incredibly huge spans of acreage giving the deer every opportunity to skip between or around the drivers. It's best to drive small areas. Put several men on stands along an old logging road or at the edge of the field, and have some men walk in towards them. The men doing the driving should be within sight of each other, so they can get a crack at deer that try to slip between them. The men on stand should be very careful to keep track of where the drivers are and where they'll come out. It doesn't hurt for the drivers to whistle or call to each other as they move. Their aim is to push the deer out ahead of them anyway and it helps the men on stand keep track of where they are. The cardinal rule for the men on stand is "once you take a stand, don't leave it." I've been on several drives where deer have crossed exactly where we figured they would, only to find that the man on the stand had moved or gone back to the truck for a cup of coffee.

When running a drive, it's also import to know the territory. You can find trails where deer will usually cross a trail or opening, and you can use natural features like streams, ridges and fields to your advantage. The deer will tend to stay in the woods and follow the contours. It's also better to run a bunch of quick short drives than waste an entire day by tackling a drive that's too long to be effective.

Like anything else, it doesn't hurt to practice a drive. Run over it a couple of times in the off season and learn where the deer usually cross and you're halfway there.

Successful deer hunting, like anything else, requires hard work, patience and planning. The hunter who does his homework well stands a good chance of putting venison in the freezer. And even if you don't bag a deer, there's a certain amount of satisfaction in knowing you've hunted hard and well. When you add the hours spent in the outdoors and the thrill of the hunt, you win either way.

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA. His favorite autumn pastimes are frightening deer with his muzzleloader and eating breakfasts in truck stops.

THE MEN IN GREEN

Ken Taylor

The selection and training of wildlife enforcement officers is rigorous.

By Rick Estes

"It's a tough three weeks. It's a combination of demanding classroom work, strenuous physical programs, and long 18-hour days."

That's the way Ray Johnson describes the North Carolina Wildlife Resources Commission's Recruit School for wildlife enforcement officers. As the Division of Enforcement's assistant chief for inspection and training, he should know.

This pre-service school is the culmination of a vigorous selection process to screen and then train the State's wildlife officers.

The recruit school was first held in its present format in 1950, three years after the State Legislature created the N.C. Wildlife Resources Commission. The three-week session is conducted in Chapel Hill at the University of North Carolina's Institute of Government, which also provides part of the instruction. Later, new employees attend a 10-week basic school in Chapel Hill.

Johnson explained that there are many more applications for employment than the number of positions in the school.

Ken Taylor

Ken Taylor

The initial three-week, pre-service selection school for wildlife enforcement officers is demanding, both mentally and physically. During this period, candidates are tested to see if they have what it takes to become a wildlife enforcement officer. Later, those selected will attend a 10-week basic school. The physical training is rigorous, and includes hand-to-hand combat (left) as well as general fitness exercises (below). In order to pass, each candidate must also complete a five-mile run (above).

Ken Taylor

"We generally receive 800-900 inquiries each year about employment as an enforcement officer, but we only invite approximately 25 individuals to attend the recruit school," he said. "And of those 25 who do begin the training, only two-thirds finish the school."

According to Johnson, the recruit school is rigorous.

"Wildlife enforcement officers must face danger, extreme physical stress, and long hours outdoors in all kinds of environmental conditions, and often they must face these situations alone," he added. "For this reason, we begin the recruit school by explaining exactly what the job is all about. Some of the individuals who have begun the training program decide right away that this is not what they want, and they leave."

But staying in the school is not the first problem recruits face — just getting in the program is an accomplishment.

The first step for a U.S. citizen who is at least 21-years old and a resident of the State is to obtain and complete a standard North Carolina application for employment and send it to the Enforcement Division's Raleigh office. There, the Division's administrative officers will review it; if the basic requirements are met, they

Rex Gary Schmidt

Once the basic courses are completed, the new wildlife enforcement officers are then assigned to one of nine districts across the State. During the course of a year, each officer checks countless hunters and fishermen, and many of those sportsmen are armed. Obviously, a high level of training is necessary for officers to perform their duties efficiently and safely.

will instruct the applicant to report to the nearest N.C. Employment Security Commission office to take their general aptitude tests.

For those who score in the high range on these tests, the next step is a physical examination by a doctor.

Those individuals who are qualified to this point will be invited to Chapel Hill for a series of exams, interviews, and orientation. These activities require a full day, and include agility and strength tests, a wildlife quiz, and thorough oral interviews with wildlife enforcement supervisors.

Johnson points out that this is as far as many applicants get in the process of becoming a wildlife officer.

"If an individual is 21-years old and doesn't know at least some basic facts about wildlife, then he probably does not possess the kind of interests that make good career wildlife officers.

"We also want to find out why he wants this kind of position. We feel that some people want a law enforcement job; what we are looking for is people who are highly motivated for a career in wildlife law enforcement," Johnson concluded.

He also explained that the Division of Enforcement, in cooperation with other law enforcement agencies in the applicant's area of residence, conducts a thorough investigation of his background and character.

Assuming that the person has met the requirements so far, and that he is still interested in becoming a wildlife enforcement officer, he will now be invited to attend the next recruit school in Chapel Hill.

While attending the school, the participant is not employed by the Wildlife Resources Commission, and he receives no compensation for his time, except that his room, meals and classroom materials are furnished.

During the three-week school, each recruit must pass some rigid physical tests, including a five-mile run. He will also learn the basic game and fish laws and the laws and regulations affecting safe boat operation. Techniques of arrests, search and seizure are also covered.

Upon successful completion of the three-week course, all recruits are placed on a waiting list for employment. They are ranked according to their overall scores on academic work, physical condition, attitude, and all other relevant qualities.

As positions become available, they are offered to the trainees according to their rank in their class. Every person who finishes the recruit school will eventually be offered a position as a N.C. wildlife enforcement officer. Some time during the first year on the job, every officer returns to Chapel Hill for a 10-week basic school. At this time, the participants are employees of the Commission and are on salary during the training session.

"Even though the selection process and the training are very tough, we are always looking for highly motivated, well-qualified applicants," Johnson said.

He advises anyone who is interested in applying for a position with the Division of Enforcement to visit or write the Raleigh headquarters at 512 North Salisbury Street, Archdale Building in Raleigh, or to call the Commission at 919-733-7192.

Rick Estes is Piedmont field representative for the N.C. Wildlife Resources Commission's Division of Information and Education.

Tar Heel Fish Made Into New Products

Those hot dogs you buy down on the coast may not be hot dogs anymore in a few years.

Scientists at the Food Science Department of the N.C. State University have been working on a Sea Grant program to find some innovative ways of using underutilized fish — and they've come up with a few that are really corkers. For starters, you can chow down on some Sea Pups — little sausage-like critters that are made from the minced flesh of croakers. Or how about some fish loaf similar to bologna but a whole lot easier on the waist line. Or maybe some fish jerky when you hit the trail. Or a pepperoni pizza that isn't (no one would buy if they called it a croaker pizza).

"What we're trying to do is find ways to use fish that are presently not being utilized," said Don Hamann of the N.C. State University Food Science Department. "So we've found a way to process these fish by running them through a mechanical deboner, then the minced bone-free flesh can be manufactured into different products. One big advantage with fish products, like the Sea Pups and the fish loaf, is they contain very little fat and have a high amount of protein. The Sea Pups fat content is only about three percent and it is about 18 percent protein. In contrast, a red meat hot dog contains up to 30 percent fat and is about 12 percent protein. The fish products are also much lower in starches and carbohydrates."

While the research in North Carolina is presently limited to using croakers, the concept could also be applied to bluefish, spot, gray trout and other fish species.

"There's really no reason that you couldn't eventually use any kind of fish you catch for this," commented Frank Thomas, extension seafood specialist for NCSU's Department of Food Science.

Thomas helped develop the seafood pizza at NCSU's Seafood Laboratory in Morehead City.

The seafood pizza has a topping that closely resembles pepperoni, but is manufactured from processed croakers. The sauce also contains fish flesh, shellfish, fish, fish broth, and other ingredients.

Luther Partin

Scientists from the N.C. State University are developing new products using under-utilized fish and other seafoods. They hope that creating new products will bring in more business for Tar Heel commercial fishermen and seafood processers. Among their creations are "Sea Dogs," "Fish Jerky," and a "Seafood Pizza."

"The seafood pizza has been very well received," said Thomas. "Several pizza companies helped to develop it, and they're sold on the idea. They're ready to go with it anytime. The cost will be competitive with other pizza sauces, and the seafood mix is very well balanced nutritionally. It meets all of the nutritional requirements set by the National Hot Lunch program."

In addition, Thomas stated that the processed fish flesh could also be used as an extender for high cost seafood products, such as crab and clam cakes or deviled meats. Up to 50 percent of these products could be fish flesh extenders without a noticeable drop in quality.

"The concept of marketing the deboned minced fish flesh could be a real boon to fishermen," said Thomas. "It will open up markets and create new fisheries that presently don't even exist. It will also help stabilize the boom and bust market for fish by giving fishermen alternative uses for their catch, other than just the fresh fish market. This should help stabilize prices, and will give us a way to use edible portions of fish that are left over after filleting. When you fillet a fish, only about 50 percent of the edible portion of the fish is used. By processing the complete fish and mincing the flesh after filleting, almost all of the edible portions of the fish can be recovered. Eventually we should be able to do this to almost any fish we catch in the sea."

The concept of using the complete fish is not a new one, but is just starting to catch on in America. It has been a common practice among the Russian, Scandanavian, Japanese and the German fishing fleets that have worked off our coasts for years. On one of these foreign factory ships, there is a complete integrated system for processing fish. First the fish are gutted and beheaded and the guts and heads are ground up into fish meal. Then the higher quality fish are hand or mechanically filleted and the portions that are left over after filleting are processed into minced fish meat. Fish that are undesirable for filleting are ground into minced fish meat without filleting, and the bones are ground up and used for fertilizer. Even the scales are used. The chances are that one of those shiney flecks you see in your kitchen linoleum was probably once very dear to some haddock or codfish in the North Sea.

— Mark Taylor

Hunter Safety Training Pays Off!

Preventing Autumn's Tragedies

Joel Arrington/Travel & Tourism

Cool fall days and hunting go together like hot soup and sandwiches. Each year, North Carolina has an average of 20 to 35 hunting accidents. Hunter Safety training programs are playing a big part in reducing hunting accidents.

As fall rolls around, hunting naturally comes to mind. Along with anticipation of one of life's finer things comes a moment of lingering doubt. Hunters may ask themselves, "Could I be a statistic this year — the victim in a hunting accident, or worse yet, the cause?" In the last seven years, North Carolina has averaged 22 to 35 hunting accidents per year; so these questions are certainly valid.

The North Carolina Wildlife Resources Commission is taking steps to reduce the number of hunting accidents. The biggest step is the Hunter Safety Program which teaches students in junior high and high school how to handle a gun safely. The course contains six hours of gun handling instruction, plus additional lecture time spent in the classroom. According to C.J. Overton, Jr., assistant chief of the Wildlife Resources Commission's Division of Enforcement and director of the Hunter Safety Program, the program has been a success.

"I'd say hunting in North Carolina is a lot safer now that it was ten years ago; and contrary to popular belief, hunting is no more dangerous than many other outdoor sports — like swimming." "Still, we want to make hunting as safe as possible. We've only kept statistics since 1971, when we started the Hunter Safety Program. It's hard to say how many accidents there were 20 or 30 years ago, because no records were kept. Since we started the Hunter Safety Program in 1971, we've had over 100,000 young people take the course and only two of them have been involved in shooting accidents. The kids that take the course don't end up going out and shooting somebody in the woods."

Indeed they don't. According to the accident statistics, the average shooter involved in a hunting accident in North Carolina is 26 and a half years old. According to Overton, there are three chief causes of hunting accidents in North Carolina.

The principal cause of hunting accidents is shooting at an unknown object. At best, this practice means mistaking another hunter for game. At its worst it's "sound" shooting — the despicable practice of shooting at a sound in the bushes in the belief that the noise is being made by game.

Hunters who trip or fall when the gun safety is off comprise the second leading category of accidents. This can be avoided by checking the safety often and always being conscious of the direction the muzzle is pointed should a fall occur.

The third leading cause of accidents is taking a loaded gun out of a vehicle. Keeping a loaded firearm in a vehicle is legal in North Carolina but is outlawed in most other states. Even though it is not illegal to carry a loaded firearm in a vehicle in North Carolina, it certainly isn't a wise practice.

A look at the accident reports from the 1977-78 hunting season shows some interesting trends. In 1977-78, there were 24 hunting accidents. Of the 24, 11 occurred while deer hunting, five occurred while dove hunting, three occurred while rabbit hunting, two occurred while squirrel hunting and one occurred while duck hunting.

"We get more accidents with deer and dove hunters than with any other group," said Overton. "There are a lot more hunters in the field after these game species than with most others. Alcohol is also a problem in hunting accidents. We don't have any cold hard figures, but a large percentage of the people involved in hunting accidents have been drinking."

There are some steps that shooters can take to minimize accidents. According to the 1977 statistics, 10 of the accident victims were not wearing distinctive colors like blaze orange, red, yellow, and other color schemes traditionally used in hunting clothes for safety purposes.

"I think wearing blaze orange while hunting reduces accidents more than any other single factor," said Overton. "I realize it's not legally required, but it's still a very good idea. This eliminates most of the accidents where the hunter is mistaken for game. It can be so dark out that you can't even see a hunter; but if he's wearing blaze orange, that color will stand out. Other colors, like the traditional red-checkered clothing, are good, but the red doesn't show up well when it's starting to get dark or when the weather's bad."

Overton would also like to see hunters quit carrying loaded firearms in their vehicles.

"Carrying loaded guns in cars and trucks leads to a lot of accidents," he said. "For one thing, it's easy for a hunter to forget if a gun is loaded when he stops for lunch or something. A lot of people are also shot while taking loaded guns out of vehicles or putting them back in. Some people argue that it's more

dangerous to have hunters loading and unloading their guns every time they move a vehicle, but the record does not support this contention and we would like to see the practice of carrying loaded firearms in vehicles stopped."

One final step Overton would like to see eventually is mandatory hunter safety training.

"Presently, we don't have the staff to oversee a mandatory hunter safety program," said Overton. "We only have three men working on the program. They train private citizens, who act as hunter safety instructors all over the State. Twenty-four other states, mostly in the north and west, require that new hunters take a hunter safety course before they can get a license, and it makes a real difference. It would definitely reduce the number of hunting accidents."

Richard Hamilton, assistant executive director of the N.C. Wildlife Resources Commission, while agreeing to the value of hunter safety training believes it would be very difficult to have a mandatory hunter safety program in North Carolina at this time.

"Administering a mandatory hunter safety program in North Carolina would be a very costly undertaking given our present financial situation," said Hamilton. "If we can get some additional funding, it's something we'd like to do. There's no doubt that it would reduce the number of hunting accidents. Currently, a bill is in Congress that would place an 11 percent excise tax on reloading components with the funds earmarked for hunter safety programs. The bill recently received a favorable report from the House Merchant Marine and Fisheries Committee. If this bill passes, then we can get enough money to finance a mandatory hunter safety program. It is a program we'd like to see."

There's one final note that hunters should be aware of before entering the field. The vast majority of hunting accidents occur within 10 yards of the shooter. This means that a hunter usually shoots someone in his own party, often a close friend or relative. In most hunting accidents, there are two victims: the man who gets shot, and the man who shoots him.

— Mark Taylor

Book Review

Ducks at a Distance
by Bob Hines
Department of the Interior
Supt. of Documents, U.S. Gov't Printing Office
Washington, D.C. 20402
Paperback, $1.80

Quite a number of years ago, the U.S. Fish and Wildlife Service came out with the first version of "Ducks at a Distance" to aid the waterfowler in identifying his birds — preferably before he shot them! It was a great little book, full of information as well as the authentic waterfowl paintings of Bob Hines.

The new version is just that much better. Fish and Wildlife Service artist, Bob Hines, (who in my judgement is the top wildlife artist in capturing the spark of life in the birds) out does himself with all new paintings of 33 North American waterfowl (21 in full color) plus several wetland birds. It doesn't have page numbers, and I didn't count them, but it is certainly pocket-size and printed on high-quality paper for durability.

Even if you don't hunt, it is a great booklet for the bird section of your wildlife library.

— Duane Raver

Getting His Un-Deer

A Maine deer hunter, who was growing desperate as the deer season wore on without him seeing hide nor hair of one of the elusive critters, tried a unique approach for getting his deer last year, according to a recent issue of *Outdoor Life* magazine. On the next to last day of the deer season, faced with spending the winter with a freezer full of un-deer meat, he placed this classified advertisement on the front page of the Lewiston, Maine, *Daily Sun*.

"WANTED — One deer, must be a buck, at least 10 points, preferably standing broadside in a field no more than 20 yards away. Would appreciate help to dress out and drag. No more than four miles from Middle Pond Range."

The ad was followed by the hunter's name and telephone number.

— Mark Taylor

Attention Artists!

Wake Art Show Set

The painting of the watchful whitetail buck on page 14 was selected by the North Carolina Wildlife Federation for its "Wildlife Print of the Year" for 1978. Wildlife artists should prepare works now for this year's competition to be held in conjunction with the Wake County Wildlife Club's annual wildlife art exhibit, November 30 — December 2, in Raleigh. Interested artists should contact Exhibit Chairman Ed Van Riper, Box 27647, Raleigh, N.C. 27611.

Parks Guide For Handicapped

"Access National Parks, A Guide for Handicapped Visitors," is now available to the general public, according to the National Wildlife Federation. The guide gives detailed information about facilities, services and interpretive programs in almost 300 areas of the National Park system.

The guide also provides information on new trails and paths that feature special information and education aids, such as raised or recessed print interpretive plaques, push-button audiovisuals, and taped or radio broadcasts along the wayside. The extensive survey allowed the Park Service not only to pinpoint areas where obstacles to the handicapped have been eliminated, but also to point out where they still exist.

"Access National Parks" is available for $3.50 from the U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402 or by writing ACCESS, Consumer Information Center, Pueblo, Colorado 81009. The stock number of the document is 024-005-00691-5.

Leprosy Strikes Louisiana Armadillos

According to a recent issue of the Texas Parks and Wildlife News, put out by the Texas Parks and Wildlife Department, armadillos in Louisiana are suffering from a form of leprosy. Although armadillo meat is considered a delicacy in some parts of the South, caution is urged before you eat one of the critters.

The leprosy-like disease was first discovered in armadillos in the Gulf Coast area around New Orleans in 1974. The mycobacterial agent involved has been found to be the closest yet to that of human leprosy.

Armadillos inoculated with the disease have been used in research on human leprosy. In armadillos, the disease is terminal within 40 months, while in humans, symptoms may not even appear until several years after exposure. The form of leprosy found in armadillos is not thought to be transmissible to humans.

In addition to being vulnerable to leprosy, armadillos aren't too bright. Ranchers in the west consider them pests because of the large number of burrows they dig. When armadillos wander off from their dens, they're usually too stupid to find them again, so they often dig a new den wherever they stop for the night.

Conservation Law Revision Hearings

In addition to those public hearings on conservation law revision listed for September in the last issue of "Wildlife" magazine, the following hearings have been scheduled for 7:30 p.m. at these locations:

District 3, Nash Co. Courthouse, Nashville, October 10;
District 5, Alamance Co. Courthouse, Graham, October 11;
District 6, Stanly Co. Courthouse, Albemarle, October 12;
District 7, Yadkin Co. Courthouse, Yadkinville, November 8;
District 8, Burke Co. Courthouse, Morganton, November 9;
District 9, Buncombe Co. Courthouse, Asheville, November 10.

Well-Aged Trap Bait

A Siberian native named Vassily has probably found the ultimate in well-aged trapping bait, according to a recent issue of *Voice of the Trapper* magazine.

Vassily had exceptionally good luck catching foxes on his trapline using meat he had found frozen out on the tundra. When some local paleontologist looked at the meat, they found Vassily's bait was part of the leg of a 13,000-year old mastodon.

The paleontologist also found traces of an ancient settlement near the site where Vassily found his meat. They estimated the age of the campsite to be about 13,000 years. There were many charred mastodon bones lying around the site, and apparently Vassily's bait was just some "leftovers that were put in the back of the fridge and forgotten."

Lewis And Clark Trail Recognized

Secretary of the Interior Cecil Andrus has sent a proposal to the Congress recommending designation of the Lewis and Clark Trail as a National Historic Trail, according to the National Wildlife Federation.

The trail retraces the famous expedition made by Lewis and Clark from 1804 to 1806. The beginning of the trail is in St. Louis, Missouri, and 3,700 miles later, the trail ends at the mouth of the Columbia River which forms the border between Oregon and Washington.

Despite extensive development along the land and water passages of the trail, the route contains a variety of historic, scenic and recreational sites. Current land ownership along the trail is approximately 49 percent private, 46 percent public and five percent Indian.

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Nature's Ways

Albinism - Nature's Cruel Trick

by Duane Raver

Karl Maslowski

Albinism is not really all that uncommon among wildlife species, but some examples of it are quite startling. This black rat snake is all white (or slightly pinkish). In many species, such an aberation may tend to shorten normal life-spans because the element of camouflage is missing.

Ever see a white black snake? No, this isn't a sequel to the lame joke about blackberries being red when they're green. Totally colorless animals do occur in nature, perhaps more frequently than we think or see. They're called albinos.

In normal animals, fairly uniform color patterns are present in individuals of the same species, although considerable variation may often occur. Some quail, for example, may be quite dark, while others — even from the same brood — are basically light colored. But in almost every animal group, a few individuals are produced which have no color at all; they are almost pure white.

This quirk of nature is due to a total (or almost total) lack of pigment in any of the animal's hair, feathers, or tissues. Skin, other exposed parts, and the eyes, are pink, in true albinos. Since there is little or no pigmentation in the skin or eyes, the capillaries just beneath the skin carrying blood are not obscured, thus they give the tissues a pink hue.

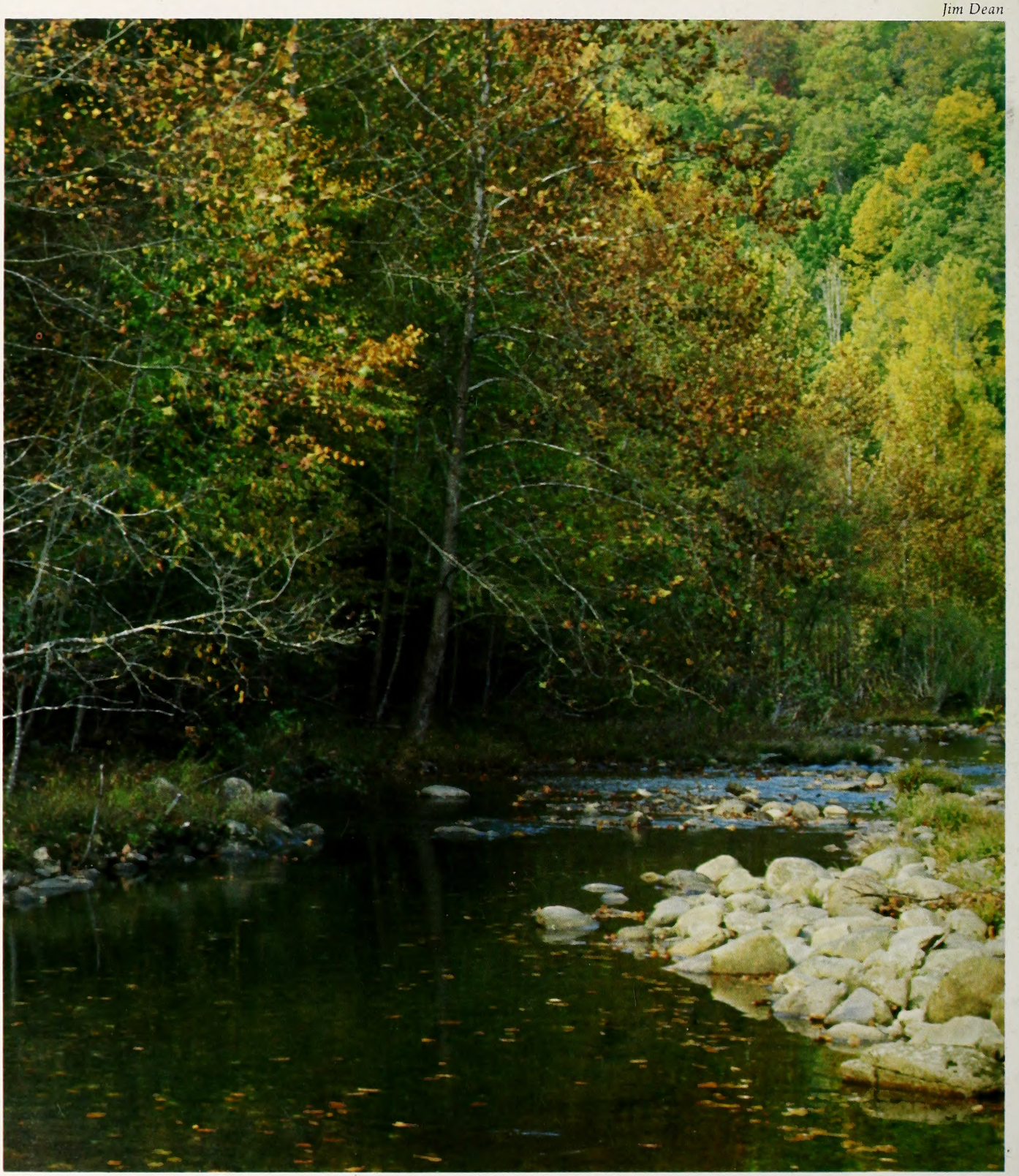
Albinism occurs in mammals, birds, fish, and reptiles. It is classed as a genetic mutation because it is a transmissible and inheritable character. But since natural color is dominant over albinism, if an albino animal mates with an individual of the same species of normal color, the albino characteristic is temporarily lost, and offspring will usually have normal color.

Of course, white is often a normal color in many species but since the eyes and skin do have pigment and thus color, these are not albinos. Some even change to white or lighter hues in the winter; the ermine is a physiological change of the weasel, for example, and is no way connected with albinism. Some cave dwelling animals and insects are colorless, but these are not true albinos.

Many of the albinos often suffer because of their "abnormality," since their visibility is simply too high for comfort. Camouflage is gone; they stand out vividly, and are singled out by predators (and hunters) and are eliminated. Even their companions of the same species desert them; albinos may be virtual outcasts and usually take up solitary existences away from groups of their kind. Weak or light-sensitive eyes may be another problem for albinos. The life span of an albino is usually much shorter than that of normal critters.

Perhaps even more spectacular is the wild animal that is a partial albino, or one that has a spotted coat. The term piebald (from the bird "magpie") usually refers to black and white or spotted horses; but each year a few deer with these strange markings are reported. Nature's way can be odd.

Jim Dean



October's Song

Bright leaves drift on the clear currents of a western North Carolina trout stream. October offers good fishing on many mountain streams.

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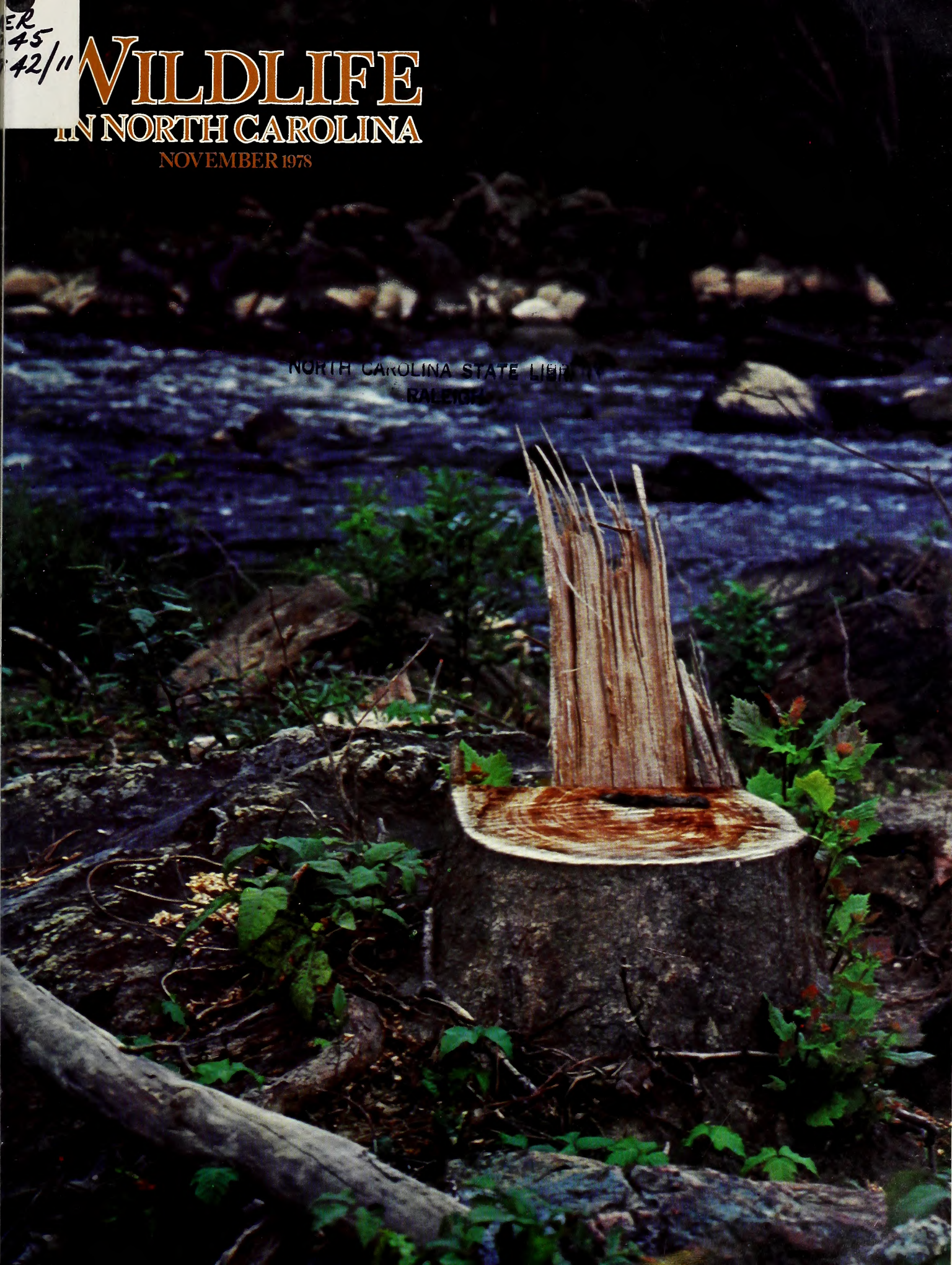
NOVEMBER 1978



NORTH CAROLINA STATE LIBRARY
RALEIGH

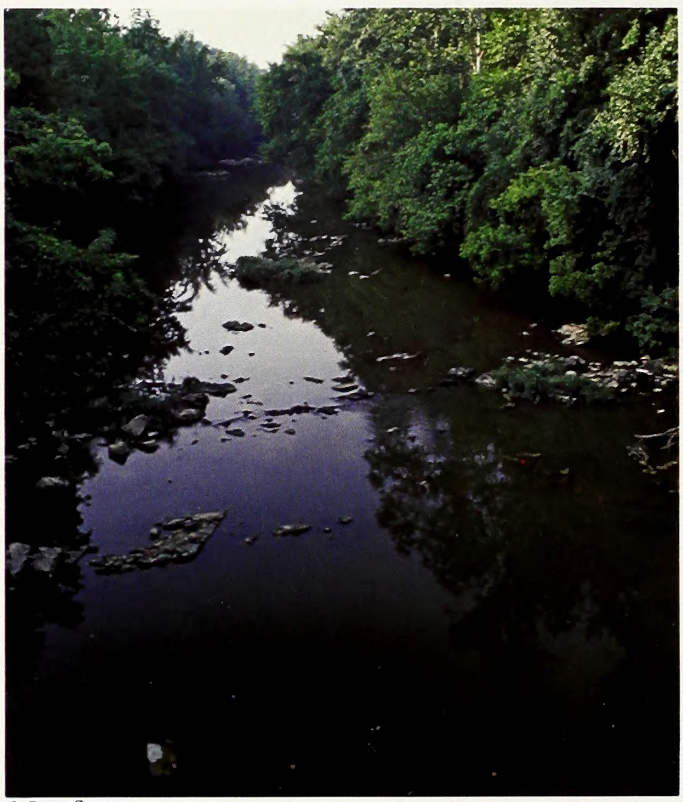
by Jim Dean

The Gift of Ignorance

School kids in at least one section of the northeast no longer routinely draw the sun in the upper corner of every picture. Instead, they color the sky a uniform gray.

The man who told me that had just moved his family to North Carolina from a heavily industrialized city, and he was excited about what he regarded as our "Southern Paradise."

"Your skies are clear and blue, half your coast is protected in its natural state and your mountains are breathtaking," he said. "Why you can even drink out of some of those mountain streams. You think you've got heavy development in the Piedmont? You don't know how lucky you are to have so many small mid-state towns. You can still go home again and recognize the land where you grew up."



S. Bruce Craven

One of the many "costs" of the B. Everett Jordan (New Hope) impoundment will be the loss of a handsome stretch of the Haw River. Many question the wisdom of a swap of free-running river, prime wildlife habitat and fertile farmland for another lake.

True, compared to some areas, North Carolina is relatively unspoiled, but we've got our growing share of problems. Furthermore, we have no particular reason to congratulate ourselves for our remaining natural blessings.

Ironically, we can largely thank what some might call our past ignorance and backwardness. Certainly, it is not through decades of careful planning that we have managed to save some of our rich natural heritage. We are not inherently wiser than folks in New Jersey, Florida or California. Had we had the same intense industrialization, money, technical know-how, booming population and ambition, it seems likely that we would have fouled our 33 million acre nest years ago.

The fact is that until fairly recently, North Carolina and most of the other Sun Belt States of the southeast, have not had the means to thoroughly exploit — and possibly destroy — their many resources. In the past few years, we have begun to close the gap, and we are now at the crossroads.

The next 10 years will be critical, and how we react will determine the quality of life we leave for our children. We can no longer plead ignorance. Other parts of the nation and world have graphically demonstrated the sad potential for irretrievable destruction.

We have made some strides in recent years. We have a Coastal Management Act, but a similar and much needed land use plan for the Piedmont and Mountains is a long way from reality. Channelization, which was systematically gutting our Coastal Plain streams, is under better control. Timber harvest, especially on public lands, is much more wisely applied. Siltation from highway and land development, is more carefully controlled, though silt is still a big problem.

Yet for every gain, countless other problems seem to arise. For example, the Chowan River and upper Albemarle Sound turn to pea soup each summer and efforts to control this algal bloom are obviously inadequate.

Wildlife habitat is disappearing at an alarming rate, often in questionable swaps (we get a polluted lake at New Hope in trade for 47,000 acres of truly prime wildlife habitat and farmland). The "superfarms" down east pose questions for which, at this point, there are no answers.

The list seems endless, and the solutions are not always clear-cut or simple. And yet, we can look at other states where the quality of life has deteriorated because no one was willing to bite some tough bullets.

If we can't learn from the mistakes of our neighbors, we deserve what happens to us and to our "Southern Paradise."

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WILDLIFE IN NORTH CAROLINA

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They Call 'Em Timberdoodles

What runs on earthworms, flies like an unbalanced helicopter, sings at its own wedding, travels mostly at night, and can be eaten innards and all?

By Jim Dean

"Worms," he said.

"What was that?" I asked as I popped the empties out of my Sterlingworth. The 16-gauge shells trailed faint wisps of smoke.

"I said they eat worms," said Mike Gaddis as he admired the tawny belly of the woodcock he'd just killed (the same woodcock I had just missed).

"Yeah, that's what I read somewhere," I answered as Mike handed the bird over for inspection. I stretched the wings and examined what must be one of the earth's most unlikely creatures. Imagine a bird roughly the size of a quail, but with a bill nearly three inches long, toes that are long and bony like the fingers of a witch, and eyes that seem to be planted almost in the back of the head.

"You know," I said after a moment. "The good Lord must have gotten a chuckle out of this one. Somehow, I've always figured He

When flushed in thick brush, a woodcock will often fly nearly straight up until it clears the undergrowth, then dart away erratically. They're tough targets, but Ted Dossett connects with this one (opposite page) in typical woodcock cover, then retrieves it.

Jim Dean

The woodcock is a strange looking bird, especially with the long bill that may reach nearly three inches in length. The bills are used to probe soft soil for earthworms.

created the first woodcock towards the end of the week. It's the kind of work you'd expect at 4:30 on a Friday afternoon."

Few would argue that the woodcock is not a strange bird. I have been fascinated by them ever since Frank Barick introduced me to the unique pleasures of timberdoodling some years ago. Frank was then chief of the N.C. Wildlife Resources Commission's Division of Game, and because of his background in wildlife biology and his interest in woodcock hunting, he had acquired quite a bit of knowledge about these long-billed migrants.

Frank and I enjoyed several highly successful woodcock hunts in the New Hope Game Land that first winter (see Michael Godfrey's article in this issue on the present plight of New Hope and the Haw River). Before it was destroyed, this area's rich bottom lands along New Hope Creek and the Haw River once afforded ideal woodcock habitat — perhaps the best in the middle part of the State.

From Frank, I learned that woodcock hunting is often a feast or famine situation. Woodcocks are migratory, and they spend most of the warm months far to the north. Each fall, they begin to move south from New England and Canada, arriving in our State in early winter. Some stay here all winter, but many pass through enroute to more southerly climates, especially Louisiana and Mississippi. If you're hunting them, you either find quite a few or virtually none at all, depending upon the migratory flights.

Flights of woodcocks arrive sporadically in the state, and the weather seems to influence this migration. If there is cold weather to the north of us, we can usually expect birds to arrive here within a day or so. They'll generally stay around until a freezing spell forces them south again. Frank believes that a hard freeze makes it difficult for them to probe the soft bottom land soil with their long bills for earthworms.

In North Carolina, the heaviest

WILDLIFE IN NORTH CAROLINA expresses appreciation to Crown Publishers, Inc., New York, for permission to quote from "Timberdoodle!" by Frank Woolner, 1974.

flights of woodcocks are found in the Coastal Plain, although quite a few birds can also be found along river bottoms in the Piedmont (New Hope was a prime example). Fewer birds migrate through the mountains. Although some birds arrive in early fall, the heaviest flights usually appear much later (the season this year is from November 18 through January 20), and my best hunts have often been after Christmas.

Although most quail hunters will occasionally shoot a woodcock while they're hunting bobwhites, very few hunters specifically seek woodcocks. Neither Frank nor I understand this because the woodcock is worth special attention. For one thing, when flights are here, shooting is often fast. I recall one day when Frank's dogs pointed more than a dozen. It's like shooting singles for quail, and timberdoodles can be equally difficult targets. Even the dogs seem to enjoy woodcock hunting; and I've yet to run across a good quail dog that will not point woodcock, although some refuse to retrieve them.

Even if you don't hunt, the woodcock is an interesting creature to observe. They migrate mostly at night for reasons not fully understood. Down east, it's not unusual to see them flutter across the highway in front of your car lights.

I followed Harlan Hall and Earl Gillis one rainy winter night while they were banding woodcocks in the New Hope Game Land. Harlan is supervisor of the central region for the N.C. Wildlife Resources Commission and Earl is a wildlife biologist from Sanford.

In order to place a band on a woodcock's leg, you've first got to get your hands on the bird. The technique Harlan and Earl used seemed strange, to say the least. After picking a suitable field for the project, they donned miner's lights (lamps with headbands that illuminate the area where you're looking). Then they unloaded long-handled nets that looked like giant lacrosse sticks, and began to criss-cross the field. In the misty drizzle, they looked like visitors from another planet.

"The technique really works," explained Harlan. "Using the lamps, we can spot the eyes of a woodcock resting in the weeds, and the light temporarily blinds him so that we can sneak up close enough to drop the net over his head."

Harlan and Earl caught, banded and released several that night, but the banding study is now complete, as is a wing survey that the Wildlife Commission took part in for a number of years.

Currently, the Wildlife Commission is funding a project by Dr. Phillip D. Doerr of N.C. State University to study the breeding ecology of woodcocks in the Piedmont section of the State. Basically, the idea is to try to learn something about the numbers of birds which are actually breeding and raising young in this State. Previously, it was thought that virtually all rearing was accomplished in the north, but there is evidence that a significant number of woodcocks are breeding here. Among the planned activities will be census checks, collections, and observation of the aerial courtship activities. (See this month's Nature's Ways. During mating season, male woodcocks gather at "singing grounds" where they go through elaborate aerial courting displays to attract a mate.)

Several of the Wildlife Commission's Game Lands have good woodcock populations during the winter months for those who would like either to hunt or merely observe them. Of course, the New Hope Game Land has had good populations in the past, but with the current land clearing underway, this area may no longer attract birds. Down east, the 18,856 acre Gull Rock Game Land in Hyde County has attracted a lot of woodcocks. Indeed, most of the eastern Game Lands get good flights.

Off the Game Lands, you should look for lowlands along creeks and rivers, especially if there are nearby fields. The birds like to use the fields at night, but are more often found in thick cover during the day.

I like to drive country roads until I find a likely looking bit of thick bottom land full of alders, yellow birch and greenbrier, then ask the landowner for permission to hunt. Usually, a brief scouting of an area will tell you its potential. You may flush a few birds if they're around, but you can also look for "chalk." Chalky splotches of woodcock droppings are very common on the leaf-covered ground if there are woodcock using the area.

Strangely enough, there exists only one good book on the hunting and habits of woodcocks. Frank Woolner, editor of SALT WATER SPORTSMAN, is author of "Timberdoodle," and this 1974 Crown Publishers' book is destined to become a classic that will take its place alongside Woolner's earlier "Grouse and Grouse Hunting."

Woolner points out that woodcock are even weird when they're dead. "I suppose you know that unlike most birds, the woodcock has white meat on his legs and dark meat on the breast," he told me recently. "Most people who eat them either like 'em or hate 'em. Me, I live to eat them, but I don't eat the trail."

Ah yes, the trail. It seems that among some fanatical woodcock aficionados, the eating of woodcock trail (intestines) is considered traditional. Woolner quotes Game Biologist William G. Sheldon, as saying that "The trail is truly excellent and eaten throughout Europe . . . it can be cleaned and baked in the body cavity of the bird, but can also be chopped up, cleaned, and made into a tasty sauce to be used as a potato chip dip at hors d'oeuvres time." Another of Woolner's friends, George Heinold (former salt water editor of OUTDOOR LIFE) says that the trail is a delicacy, "tasting something like calves' brains."

As for me, I'm with Woolner. I like the faintly liverish flavor of woodcock, but I think I'll stick to trails I can hike.

By now, you may be wondering if there is anything normal about these birds — or the people who hunt them.

I can't speak for other woodcock hunters, but I'm quite sure that I'm perfectly normal. After all, what is odd about spending six hours climbing through a virtually impenetrable jungle of greenbriers for the singular honor of missing a timberdoodle with both barrels?

Nevermind. I'm sorry I asked.

Jim Dean is associate editor of WILDLIFE IN NORTH CAROLINA, and likes to hunt and observe woodcocks.

Hanson Carroll

The Classic Doubles

A fine shotgun is not necessarily a symbol of death, but a priceless heirloom, a work of art, and a bridge back across the years.

By Mike Gaddis

False dawn lay cold and clear over the shimmering, moonlit surface of a solid freeze. Heralds of restless waterfowl came plaintively to ear and a periodic splintering of ice violently shattered the deep still. There was belling of journeying geese and the highball of harbored greenheads from resting stops in scant open pockets.

Across 56 years, these nights had always been the same — times for sentiment and reflection — heavy contrast to those fierce and blustery nights with rolling whitecaps, driving rain, or hurling sleet and snow.

In the weathered frame clubhouse of a thirties ducking fraternity, Miles Lancaster rocked slowly before a dying fire. Companions long since retired, he sat alone. Flickers of flame from lingering coals eerily illuminated shadowed corners left by the struggling kerosene lamp, and a pendulum clock on the mantle pleasingly kept step with time's unending procession. Cradled across a knee was a shotgun, the substance of his thoughts.

Fireglow highlighted wandering burl beneath the patina of its oil-rubbed Circassian buttstock and the fine checkering and carving were pleasant to his touch. His eyes followed the exquisite lines of engraving painstakingly hand-chiseled into the rich case-

Ken Taylor

High grade American made double barrel shotguns, like the De luxe Grade L.C. Smith (left) and the Optimus Grade Lefever (right) have been out of production for years and are too valuable for field use.

Only six 20-gauge Deluxe Grade L.C. Smith doubles with gold inlays were made (above right), and at current values, this gun might bring $65,000. This 12-gauge Optimus Grade double barrel Lefever trap gun (below right) is a sidelock, like the Smith, and might bring $12,000 or more from a collector unable to resist the graceful lines and elegant engraving.

Hanson Carroll

hardened steel. The cut of Trent, his big Chessy dog, lay boldly on the receiver. Raising it to shoulder and swinging, it followed, alive in his hands. Parker was a master maker all right. The other fine arms of his acquaintance were pleasingly nice, but he had never regretted his choice.

It was more than a fine gun now, after 38 shooting years. It was the most tangibly enduring part of his love affair with life. Gunning companions pass; good dogs are granted but few years at best; time is heartless with the fragile details of memorable days, but the gun remains as the most imperishable part of the shooting life. Enduring, it comes to symbolize all else. Miles Lancaster liked to think of it that way. Having become a part of him, it would be all that lived on after he, too, had paid back his years.

Etched indelibly as I wish to remember it, this is the sketch drawn to mind when I recall the words of Murray Hoover, passing in trust to me that same Parker shotgun which his lifelong companion, Miles, had similarly entrusted to him. Murray was a shooting man of 73 years, generally admired and respected in that light, with a practiced and cultured appreciation for the sporting life afield. Of what he spoke, he knew, for he was of its era, and the stalwart stature of his image has much to do with the deep regard I and others have for the quality American double gun two generations later.

For another man of his day and inclination, it might have been a Fox, a Lefever, a Smith, or an Ithaca. Together with Parker they represented the offerings of the five premier gunmakers from the 1880's to the mid-twentieth century.

In varying qualities and options, always to the customer's wishes, they competed in rich burled walnuts, fine Chromox, Peerless, and Whitworth steels, intricate scrolls and game scenes. By this course, an art form grew which gave unparalleled expression to the craft

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and satisfied together the most utilitarian and discerning of the sporting public. Pride of workmanship at the height of their zenith years was such that it took fully two months of largely hand labor to ready one unfrilled field gun for shipment from the factory. And on the Carolina marshes, in the Arkansas pin-oak bottoms, the shooting wagons of the great Georgia quail plantations, and the Vermont grouse woods, their names became commonplace and esteemed.

While other reasons did in fact contribute, the dark economics of the Depression and the war years of the early forties are generally held as the death agents for those hallmark years of American gunmaking. From the finance and solvency viewpoint, this seems irrefutable; artisan quality grew prohibitively expensive to sustain. But in looking back, it may be easily surmised that the changing tastes of the sporting public also contributed strongly. A product of such specialization as a fine double gun demands a staunch and appreciative patronage. In the post-war decade such patrons no longer represented the consumer majority. Mass production, a new generation with changing values, and a drift in preference brought the repeater to unprecedented popularity, and the pump and autoloader its immense following.

One by one they fell, becoming subsidiaries and then discontinued specialty products in larger and more solvent companies, or succumbing finally to the forced-choice decision of the directing board. With the passing of the Ithaca and L.C. Smith line from production by the early fifties, their years in the open competitive market came to an end.

In the years since, various double guns have been produced in the United States but none, save possibly the Winchester Model 21, has approached its predecessors in quality. Today, this may be cause for wonder. It would seem that the demand and buying power is

Of all the fine American doubles, the Parker is generally considered the most collectible. Oddly, Parker made only one presentation shotgun, a D Grade with special engraving, which was presented to General Blackjack Pershing. It features a leaping elk on the underside of the receiver (lower left); and despite the fact that Parker made much higher grade doubles, this gun – because of its one-of-a-kind rarity – is valued at approximately $100,000. Lefever made this elaborately engraved shotgun (upper left) which was presented to President Benjamin Harrison. It features Harrison's initials in gold (below), and is estimated to be worth at least $75,000. Ithaca also made quality doubles, and this Grade IV – while not nearly as valuable as the other guns on this page – has extremely delicate engraving.

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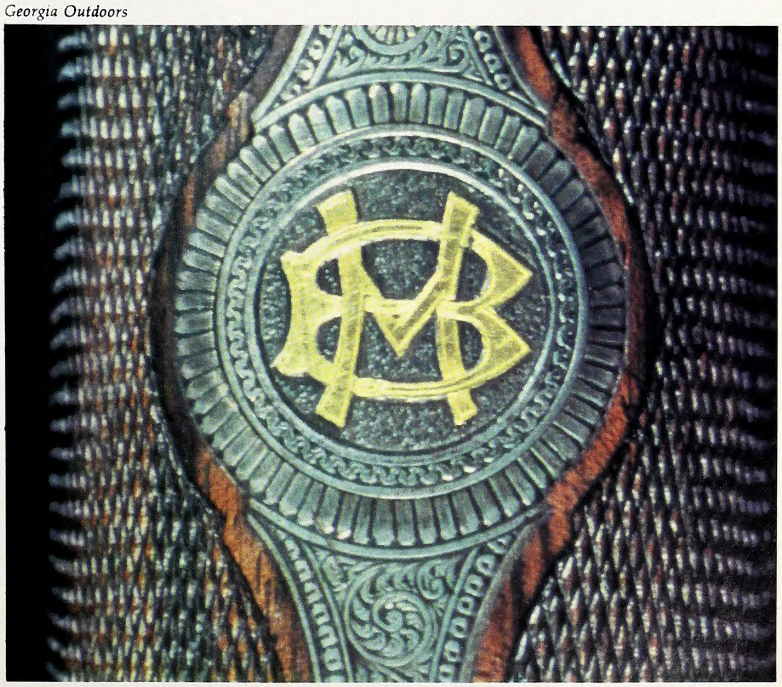


present to again sustain an equal product. Certainly the nostalgic romance of the "golden years" surges strongly and hand craftmanship is still greatly valued by a goodly portion of the population.

But the years have brought an impasse. If indeed the collective gun-making talent necessary to duplicate a high grade Parker or Lefever still exists in this country, and this is doubtful, the economics of bringing it together would be staggeringly prohibitive. And even assuming the purchasing power of modern America, consider that the best grade L.C. Smith of 1913 sold for $1,000 and imagine its relative counterpart of 1978.

So by acclaim and circumstance, the original guns have become immensely popular with collectors. The days of the Grade 7 Ithaca forgotten in an attic corner and waiting to be discovered are virtually gone. The quality American double is generally known to be of esteem and value and has been so ardently pursued as to preclude that possibility. Collections exist by the scores, built on the one hand in pure and straightforward appreciation and on the other through sheer and uncompromising speculation. The effect of the latter has been profound. Owning Parkers, Foxes, and Smiths is akin to having an impressive Swiss bank account with a geometric interest rate.

Building a collection or even purchasing a single gun will wisely not be a casual endeavor. There are many tricks of the trade and much to know. Great pains should be taken to seek out a knowledgeable advisor. The higher grade guns are at present exchanging hands at five-figure sums. And it is ironic and unfortunate that many collectors with true appreciation and modest means must endure a strain on livelihood to own even a field grade piece.

The guns of Ansley Fox, Parker Brothers, L.C. Smith, Ithaca, and Lefever Arms have endured and will last. In incomparable fashion, they have captured the deepest, most steadfast values of the shooting life, and the flavor, mood, and gentility of their period. They are arms of intrigue for each is easily imagined as the enduring part of a deeply personal affair with someone generations gone. Someone of the transition years of the century who, in velveteen and necktie, may have pulled it from a worn saddle scabbard to take a rise of quail, who might have swung it past the 25th bird of a snipe limit in a lowland bog, who may have rested with a setter in the alders and contemplated the brace of woodcock lying beside it on a haversack, or perhaps stopped gum-booted in marsh mud, cradling it in arm to watch endless flights of waterfowl at twilight. For those of us of the persuasion, this is a classic double's true value, not the arithmetic on a bill of sale.

Great-grandsons and daughters are now growing into the life afield. Many good things have passed which they will never directly know. But some will hear, and read, and feel a deep longing when they see pictures of their forebearers with guns, and dogs, and game. The more fortunate will come, through bequeath or interest, to discover and own a Smith or Fox or other fine arm of one of the masters. And for the relative few who truly yearn to cross, it will be the bridge back across the years. ⟐

Mike Gaddis is an avid sportsman and dog trainer. He has written numerous articles for WILDLIFE IN NORTH CAROLINA over the years.

Jim Dean

The Ansley Fox Gun Company of Philadelphia made one of the most durable of the fine early American doubles, including some high grade models like this DE Grade Fox 12-gauge, which is currently valued at around $7,500. Engraving on Fox guns was often boldly executed.

WILDLIFE IN NORTH CAROLINA wishes to express its appreciation to Atlanta Outfitters, Inc., Doraville, Ga., and GEORGIA OUTDOORS for their cooperation in obtaining many of the guns and photographs for this article.

What Price Wildlife?

Income hasn't kept pace with the rising costs of wildlife management and research. Here's an analysis of the problems and some possible solutions.

On one hand, you have a spiraling inflation rate and a demand for more services. On the other hand, you have a dwindling base of sportsmen who provide the sole source of financial support to the wildlife conservation program through their license fees and excise taxes on equipment. Caught in the middle is the North Carolina Wildlife Resources Commission.

"The Commission is presently in a tight situation as far as finances go," commented Richard Hamilton, assistant executive director of the N.C. Wildlife Resources Commission. "We are struggling to meet our budget this year, but next year we're going to need additional sources of revenues. It looks as though these funds have to come through a license fee increase, which has the potential of becoming a politically controversial and unpopular proposal."

To understand the Commission's financial situation, you have to understand how the budget works. There are two funds within the Commission: the wildlife fund and the boating fund. Wildlife fund monies are raised solely through the sale of hunting, fishing and trapping licenses and from federal excise taxes on sporting equipment which is apportioned to the states. Boating funds come from motorboat registration fees, from a portion of the non-highway gasoline tax and from the U.S. Coast Guard. All wildlife funds are used for wildlife work and boating funds are used for boating projects. The predictable, steady growth in the number of registered motorboats in North Carolina has provided adequate financial support to maintain services to the boater over the years. A slight increase in motorboat registration fees is planned in 1980 to generate additional boating funds to help provide requested increases in services to boaters. Motorboat registration fees have not been increased since the Boating Safety Act was passed in 1959.

The greatest problem facing the Commission today is a decline in the sale of hunting and fishing licenses and the failure of the revenue generated from their sale to keep pace with inflation. The trend is not confined to North Carolina, but is taking place in many other states as well. While the reasons for these declines are not known for certain, it appears that decreasing hunting and fishing opportunity due to an ever accelerating loss of good wildlife habitat, coupled with a greater availability of alternative outdoor recreational opportunities may be responsible. For whatever reasons, as hunters and fishermen decline in numbers, the amount of license revenue and Federal Aid revenues from Pittman-Robertson (P.R.) and Dingell-Johnson (D.J.) goes down accordingly. These federal funds are raised through an 11 percent excise tax on guns, ammunition, and fishing tackle. Allotments are given to individual states based on their land and water areas and the number of certified hunting and fishing licenses sold within that state.

"In the fiscal year of 1976, we received $1,490,000 in P.R. funds for wildlife work," Hamilton said. "Last year, we received $1,043,000 in P.R. funds for wildlife work. That's a loss of over $450,000 that has to be made up somewhere. The same thing happened with funds for fisheries work under the D.J. program. In 1976, we received $402,000 from the Federal Government; in 1977, we received $20,000 less."

Federal funds for fishery and wildlife work fluctuate from year to year, depending on the state of the economy. The real nucleus of financial support for the wildlife program comes from license sales, and the overall number of sportsmen in North Carolina has been declining since 1975. In 1975, there were 436,056 hunting licenses sold in North Carolina. Every year since has shown a slight decline; and in 1977, the latest year that figures are available, the number of hunting licenses

By Mark Taylor

stood at 378,417. Fishing licenses have taken a similar drop. In 1974, there were 509,187 fishing licenses sold in North Carolina. In 1977, 458,224 fishing licenses were sold. The loss of 58,000 hunting licenses and almost 52,000 fishing licenses has taken its toll.

"We work on a biennial budget, which can be a tricky business," said Hamilton. "We have to figure out what our revenues will be two years in the future, and tailor our budget to fit our revenues. This drop in fishing and hunting licenses is something we didn't foresee, and inflation also hurt us very badly."

The rapid rate of inflation that has run rampant for the past several years has hit the Commission hard.

"We made up our 1978 budget in 1976, and some drastic price increases have taken place that couldn't be foreseen," said Hamilton. "When we made up the budget, we estimated the cost of a patrol car to be $4,200. They ended costing $5,700 apiece, and the cost of gasoline has also increased significantly in that time. Transportation is one of the biggest expenses this agency has; we've got over 200 enforcement officers and over 100 biologists and technicians and everyone of them must have a vehicle to complete his job assignments. We try to trade our vehicles in every three years because they go over a lot of rough country and get a lot of miles put on them. Also, salaries, employee benefits and supplies, especially agricultural and construction materials, have significantly increased in cost."

Another problem that adversely affects the Commission's revenue is free licenses. Free lifetime fishing and hunting licenses are available by law to anyone who is over the age of 70 and to anyone who is disabled. In addition, anglers using live bait in their home counties don't need a fishing license. Lifetime combination licenses for persons over 65 and for disabled veterans are sold for the one-time price of $10 and $7.50 respectively.

"Free licenses are decreasing our financial base," Hamilton remarked. "We started giving licenses away in 1969 and we've issued over 118,000 complimentary and low cost lifetime licenses since then. Part of the proposed license increase will be used to subsidize the loss in license revenue from these free licenses.

"The bait fishing law should be repealed. It was originally passed when many people depended on what they caught for a substantial amount of their food, but that's no longer the case. It was a good law during the hard times we had in the thirties, but it's outlived its purpose."

Many states have attempted to keep up with inflation by hiking license fees, but that's a step that must be carefully assessed.

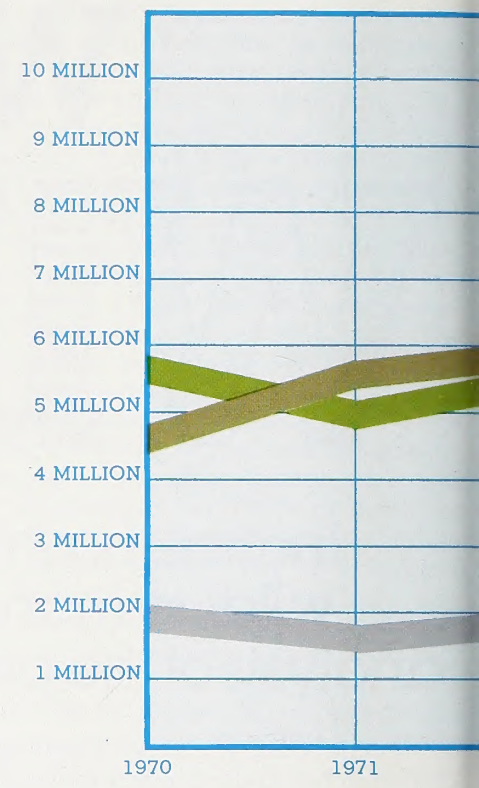
"Hiking license fees can turn into a vicious circle," Hamilton said. "We don't want to price sportsmen out of the market; and while the increase in license fees hasn't kept pace with the increase in inflation, sport licenses still cost a significant amount of money. When we raised license fees in 1975, we had a decrease in sales. We've got to remember that our market for hunting and fishing licenses is declining and will probably continue to do so. Some licenses may be able to stand a small increase, but we'll have to be very careful when we raise fees."

The Commission also has a much wider range of duties than it has had in the past.

"We're required to do a lot of things that we get no revenue from," said Hamilton. "In the past, we were only really responsible for fish and game animals. Now we have to assess the impact any state and federal project will have on all wildlife, and we're also responsible for managing and protecting nongame wildlife. All of this costs money, and we're not receiving any extra funding to do it."

The Commission anticipates an operating deficit of over $900,000 in 1978-79 and the situation is rapidly becoming critical. The cash balance currently on hand will carry us through this year, but this year's deficit will deplete the operating reserve.

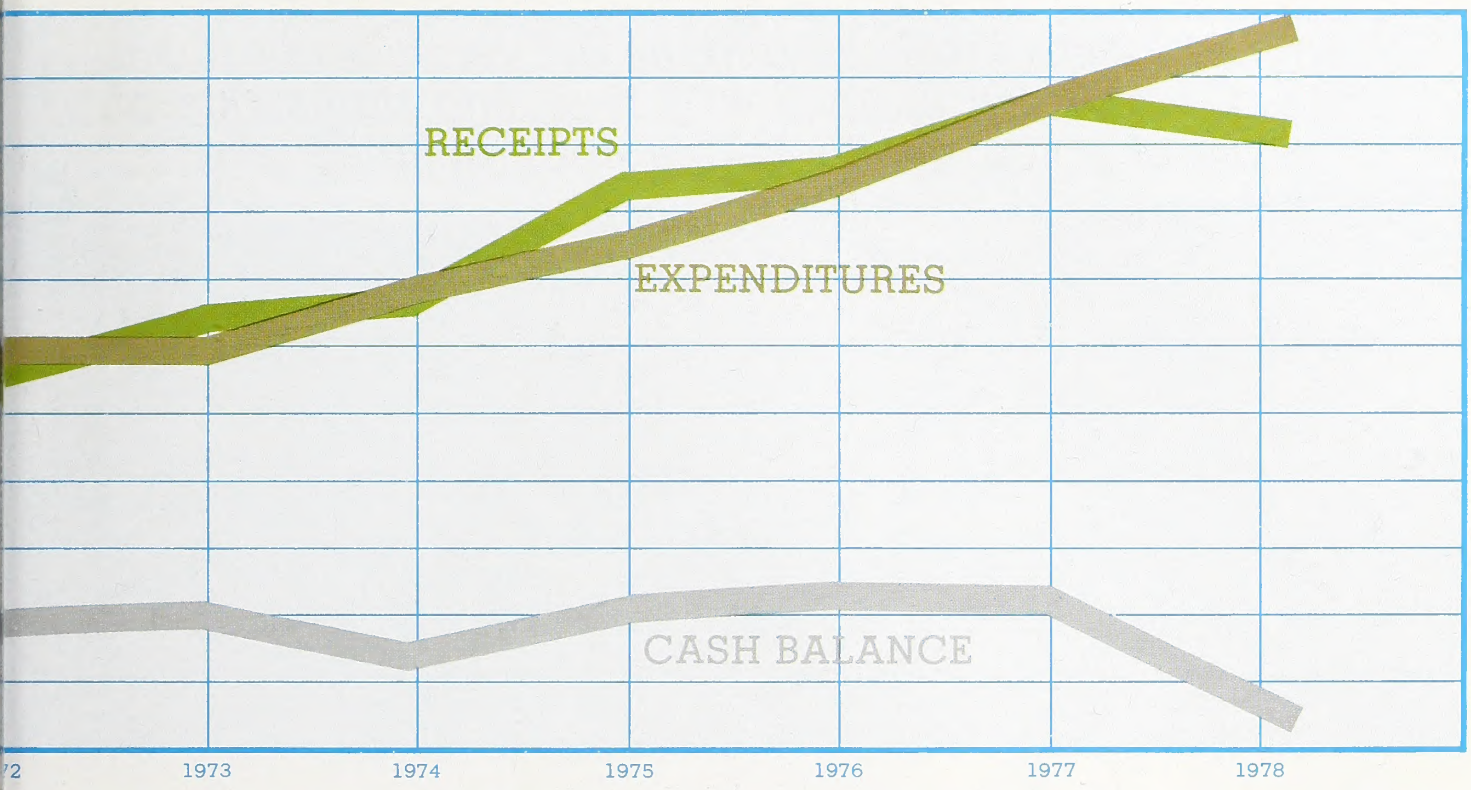
"What we've got now is a serious annual deficit due to falling license sales and rapidly increasing costs of operation," said Hamilton. "A real problem is developing. If we get to the point where we can't pay our bills, we'll be forced to cut back on some of our services. The real crunch will come in the summer of 1980. If we haven't obtained an additional source of revenue by then, either from a license fee increase or from some other source, then we won't be able to operate at our present level. I've gone through our budget very thoroughly, and there's no fat in it. It'll be tough to make the cuts, and the wildlife conservation program in North Carolina will suffer if some remedial action is not taken now."

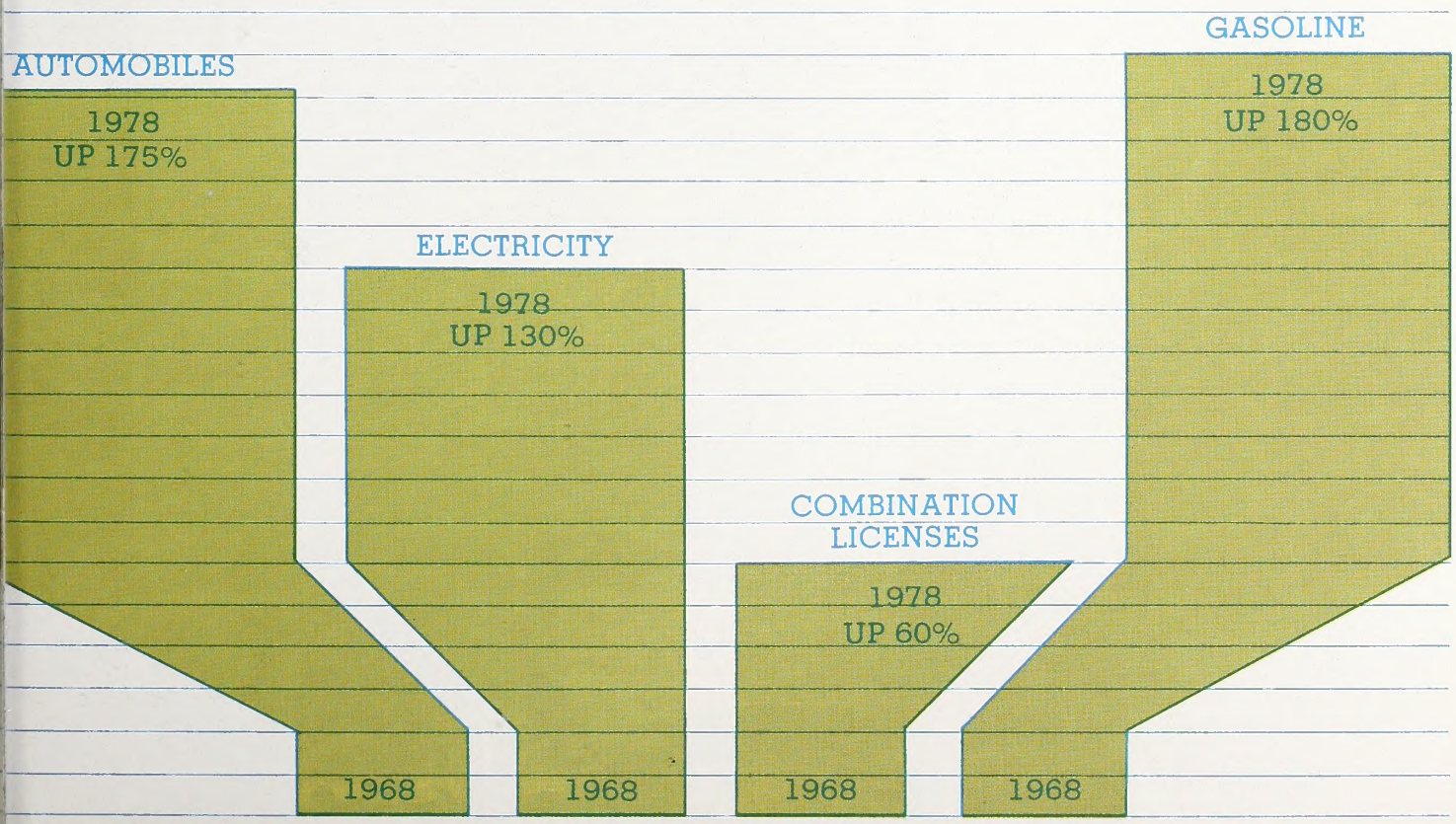


The Wildlife Commission's budget picture, shown above, indicates a steady, upward trend of both receipts and expenditures from 1970 until the present. The problem is that since about 1975, expenditures have climbed at an accelerated rate, while receipts have leveled off. A serious decline in the Wildlife Commission's cash balance is the result of this greater "outgo" than "income."

Comparative rises in prices of several basic items are shown at right. Two facts are evident: inflation has pushed operating costs up as much as 180 percent from 1968 to 1978; and, the cost of a combination hunting and fishing license has increased only 60 percent during that time.

Mark Taylor is assistant editor of WILDLIFE IN NORTH CAROLINA magazine.





Charts by Glenn Lewis

Tragedy In The Piedmont!

Controversy still swirls around the B. Everett Jordan Dam project which will swap a wild river and thousands of acres of prime wildlife habitat for a polluted lake.

By Mike Godfrey

S. Bruce Craven/Mike Godfrey Ins

WILDLIFE IN NORTH CAROLINA is a forum for the discussion of all environmental issues important to North Carolina. Presented here are views on the proposed B. Everett Jordan Dam project. – The Editors

I know a place where an island parts the Haw River, and on its north side the waters dance around sculptured boulders for some yards then rest in quiet depths below a sheer rock face. Across the pool is a 10-yard crescent where the river has sorted sands and gravel onto — so far as I know — the world's most secluded beach.

I visit my sanctum on the Haw a few times each year when I need the strength of its solitude. I lie on the rocks, my body awash in the current, my spirit running with the living river. Today the flow lifts me playfully off one rock and floats me to another. A kingfisher streaks over at head-height rending the air with its raucous rattle. I wedge in, rest my head upstream on a pillow of tumbling water and doze between the intermittent nips and nibbles of tiny fish.

Two red-shouldered hawks wheel over me, and their calls cry me full awake. In the oaken snag which towers from the face of the rock sits their fledgling. It is June, and young hawks are trusting enough to indulge their curiosities — no warning screamed from the clouds could deter the true seeker from examining the strange figure sprawled in the river where one's parents catch water snakes and plump pickerel frogs. Concluding that its mother will not bring the water snake now dangling from her talons to the accustomed feeding perch while the white-bodied animal is so near, the fledgling launches and flaps awkwardly out of sight over the island and across the main channel to a more secluded perch.

"Look at the hawk!", calls a youthful voice excitedly, followed by the resounding bong of an aluminum canoe taking a hefty broadside on a rock.

"Keep your eye on the river, John," comes a fatherly admonition from astern. Laughing at the bow, grumbling at the stern, rumbling over rocks amidships, the canoe kettledrums its way downstream.

That was early summer and the flow was modest.

How I wish it were early summer still. I returned to my cosmic place in mid-summer and met the bulldozer. The river's banks were stripped and lifeless. In shocked disbelief I waded upstream and found the cast iron devil ravaging my island. It backed out onto my private, personal beach, pivoted on one track and churned the gleaming little strand into swirling muck. The monster growled, faced a big river birch, sliced it with its sharpened blade and rolled it into a heap of vegetation at the island's center. A prothonotary warbler appeared carrying a caterpillar. He hovered at the coordinates in space where, seconds before, his brood had cried for food in their woodpecker-excavated nesting cavity in some deadwood in the river birch. By now the nest was crushed beneath the cleats of progress, the young warblers mashed and blended with the mass of fresh-killed river bottom life being pushed contemptuously into the heap for cremation. Flies buzzed their death-whine as I stepped on the shards of bloody shell that had been a turtle.

I wanted to run. I wanted to stand and fight. I wanted to vomit.

The fact was I could do nothing but stand and watch as the big yellow Caterpillar D-8 abolished a part of the earth I had come to assume was sacred, therefore, sacrosanct. The island is small. The bulldozer wasn't long doing its work. With the last of the sycamores, sugar maples and river birches crammed rudely into the pile, the beast took a breather. The engine died, the driver mopped his brow.

"Howdy," he grinned and spat a brown streak. He spat another that looked somewhat thicker, then lit a cigarette.

"Hello," I heard myself say. My legs took me toward the great machine which hissed and ticked in repose.

"These bugs are something else, aren't they?" The clouds of displaced gnats and crane flies which had moments before been resting peacefully in the leaf litter, made his question rhetorical. "Time you got?"

I told him.

I learned that he worked for a Missouri contractor to which had been awarded the contract to clear 14,000 acres (yes, unfortunately, that's the correct number of zeroes) in the Haw and New Hope Creek basins by next April. The company has bought 22 new tractors "like this booger" (pat, pat) to do the job. The driver had been born in nearby Moncure and he still lives there. He asked what I was up to and I told him I wrote about nature and photographed wildlife. He lit up.

"I mashed up a deer downstream," he exclaimed, "but I've got the fawn at home. Been keepin' him and feedin' him!"

"That's very kind of you," I said.

"Aw, Lordy, I must'a seen a 100 deer in this bottom in the last two weeks," the driver beamed. "Ten, 12 at a time!"

I asked what he thought would happen to the deer.

"This'll run 'em out," he said, not without concern. "People'll kill 'em. Nobody ever came back in here much, 'cept to fish. Too wild."

I asked what he thought of the lake project; and after suitable consideration, received this response.

"I think it's a good idea. I like to fish. People will get used to it and they'll like it."

Yes, I thought, at least the lake will provide a place to fish.

"Time is it now?"

I told him.

"Quittin' time. Look out!"

I jumped from the tread as the iron demon coughed and belched its black breath into the clear July day. It clanked and growled and headed downstream, vital parts seeping diesel oil, hydraulic fluid and tobacco juice.

"What do you think of the B. Everett Jordan impoundment?" I asked Howard DuBose, owner of a canoe outfitting store in Chapel Hill. He glared at me and mumbled a stream of unprintables regarding the wisdom of destroying the part of the Haw which affords "The best white water within a five-hour drive of the Raleigh-Durham-Chapel Hill area. Nothing else in the Piedmont of North Carolina touches the lower Haw, the stretch of the river between the Route 64 bridge and the 'steel bridge' (C.R. 1941). Nothing. People come from all over the country to run that stretch of the river and that's the part that's going to be flooded by the lake. The Haw has a gradient there of about 35 feet per mile. It's big and wide and has dozens of alternate routings and small channels, each a challenge. When the river's running one foot above normal flow, there are parts of it rated as tough as the Chattooga which is the most popular white water river in the Eastern United States. And unlike the smaller rivers round here — the Deep, the Little, the Neuse — the Haw keeps on flowing. It doesn't just flood for half a day then quit. The Haw gets up and stays up for days."

DuBose paused then added thoughtfully, "The Haw is a unique white water resource, a super-quality river. I helped pioneer canoeing it and I'm pretty darned unhappy about seeing it destroyed."

"But what about the lake?" I protested. "That'll be good for fishing and swimming and boating and . . ."

"Yeah, that's just what we need around here — another lake. In the Eastern Piedmont we already have Kerr Lake, Lake Gaston, Lake Michie, Lake Tillery, Lake Butner and Badin Lake and there'll soon be a lake behind the Falls of the Neuse Dam. People drive to a lake in one overpowered car, then boat around on the lake with another overpowered

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The mangled remains of a creek and smoke from countless smoldering brush fires mark the area being cleared for flooding when – and if – the gates close on the B. Everett Jordan Dam. Those concerned about the questionable trade-off of a wild river, prime wildlife habitat and rich farmland for a polluted lake find the U.S. Army Corps of Engineer's "Building Tomorrow Today" sign sadly ironical.

motor, zipping around the few people who fish and sail. Fishing and swimming? The heavy metal poisons and other filth in the Haw River will make the fish inedible, and I'd sooner swim in furniture dip."

"You sound bitter," I said. "Is the impoundment going to hurt your business?"

"Of course it's going to hurt my business," DuBose snorted. "I'm in the business of renting and selling canoes and kayaks for use on white water. No white water, no revenue. But I'm also concerned about what the impoundment will do to the quality of the life styles of a lot of people who live around here and who enjoy white water sports. I know of some who live here principally for that reason, and they'll leave when the river is killed."

"How many people use the river for white water sports?" I asked, not quite sure what the term meant.

"Oh, on a good week-end day, maybe 50 rental canoes, twice that number of privately owned canoes and kayaks, a few rafts and who knows how many people in tubes. Maybe two, three hundred people will run the river in some contraption or another any day its up. And interest is building — the sport is just getting started around here. You should see the canoeing and kayaking on the rivers up north."

"If so many people use the river for white water sports, how did the dam get built in the first place?" I wondered.

"The Corps (of Engineers) slipped it in while all the young people were in Vietnam, like I was, or at home protesting the war," DuBose said. "They'd never build it if it had to start from scratch now. The Corps has admitted as much."

"Well, how come there isn't an effective protest against impoundment? Why don't the canoers raise cain to force the Corps to operate it as a dry lake?"

"The sad fact is that the guy with a $500 canoe hasn't the wealth or political clout of the guy with the $5,000 speed boat. Money is what talks as far as the politicians and bureaucrats are concerned. It's a shame, because people can get into white water sports cheaply — *real* sports that involve skill and training and nerve and discipline, sports that put you into intimate contact with nature without changing or demeaning the environment."

Joe Coates agrees. Joe runs another outfitting store in Chapel Hill and is billed as an Olympic-grade kayaker himself.

"There are two centers for paddlers in North Carolina," Coates said. "Nantahala and Chapel Hill. The lower Haw is the attraction east of the mountains. Much of our business depends on the river being left alone."

"Is white water canoeing really all that great?" I asked. It was a mistake. Coates was aghast.

"You've never canoed the Haw? Get in that van, you sorry piece of horsemeat!"

Before I could invoke a conflicting appointment or a disqualifying ailment, I was carrying one end of a canoe past a sign at the Route 64 bridge calling to my attention that the Haw had killed several people lately and that it should be navigated only by experts when the flow exceeds one foot above normal.

"Fantastic!" said Coates eyeing the markers painted on the bridge abutment. "Two feet, two inches. You won't forget this ride for awhile!"

That's for sure. Coates wasn't content to careen through Gabriel's bend where waves stood like shocks of corn — we came through upright but with the canoe full to the gunwales — and to plunge into assorted souse holes and over places where the river fell abruptly away from beneath us. We had to "surf" the hydraulic at the Smooth Ledge.

"Left, you fool!" yelled Coates. "Now right! Paddle like mad!"

I was certain, of course, that both of us were mad. Coates

Looking north from the high ground at the B. Everett Jordan dam site, one looks across a stretch of the Haw River and the rich bottom lands which already show the scars of clearing.

David Williams

for sticking the nose of the frail craft into the boiling hydraulic and me for being there in the bow seat as tons of brown water roared over me. The river took me then into its gaping maw, swished me about between its bulging cheeks, gargled me for awhile, rattled my helmet against its granite molars and spit me out yards downstream of the hydraulic.

Spouting water from every hole in my head, I surfaced in time to see Coates, high and dry and flexing arms the size of my legs, haul the canoe half onto a rock, dump out the 100-plus gallons of water and scoot the boat my way.

"Where's your paddle, River Rat?" He grinned through a thicket of red beard.

I noticed then that the river had also helped itself to my left shoe and my shorts. My helmet, strangely, was in my left hand.

"Next stop, Finders Keepers!" chimed my guide gleefully, handing me the spare paddle.

Finders Keepers turned out to be an immense hydraulic where the silken contours of a vast pillow of water rode over a boulder, plunged downward to form a hollow which would have neatly accommodated an inverted Volkswagen, then burst upward and erupted back upon itself in 100 directions in a six-foot wall of surf. The formation would have awed me had we simply skirted it for a close look. Coates had other ideas.

"Full speed ahead or we'll spend the night in this hole," he said aiming the bow — that's my end of the boat — into the hydraulic's frothing jaws.

It ate us.

I finished the "Pipeline," a 200-yard chute in which the river falls 20 feet, trying to keep my feet ahead of me at the surface and gripping desperately at something in my left hand which, in calmer water, proved to be a paddle. In the sudden loneliness of quiet water, I scanned the river frantically for Joe. Did he make it? Were he and the canoe still doing cartwheels in Finders Keepers?

"How about a ride?" said Coates sitting nonchalantly in the canoe in an eddy as I floated past.

At this juncture I would be hard-pressed to contend that the lower Haw is not presently — without the impoundment — fulfilling an important recreational function; in fact, a unique one for there is no alternative river of its magnitude in the region. White water sports appeal to a select group, to be sure; and if I suggest that a touch of insanity may be required, I speak from the viewpoint of a white water convert. Coates sold me the canoe.

More importantly to the lover of nature, the birdwatcher, the hunter, the seeker of wild places, is the alluvial forest life system which clings to the Haw's banks. Of the 47,000 acres which the U.S. Government acquired in connection with the B. Everett Jordan Dam project, perhaps half are alluvial bottom lands. Because of their frequent flooding and high, year-round moisture, these bottom lands sustain a life scheme entirely distinct from that on the better-drained adjacent slopes. The bottom lands along the Haw are, for the most part, too narrow to have been farmed and they are therefore cloaked in maturing alluvial forests composed of trees confined to that habitat — sycamore, hackberry, river birch, sugar maple, and red maple over musclewood *(Carpinus)*, witch hazel, spicebush *(Lindera)* and alder. In places protected from the mechanical damage of flooding, there are trees associated with even greater alluvial maturity, such as the American elm, shagbark hickory and American beech. Willows grow where there has been recent disruption.

These alluvial forests host birds, mammals, reptiles and amphibians who dwell nowhere else. In the Piedmont of North Carolina this includes the red-shouldered hawk, a bird whose continued existence outside the southern coastal and swamp forests is very much in question. Reason? The remote bottom land habitats it requires are being increasingly occupied by the standing waters of man-made lakes. The barred owl, the green heron, the great blue and little blue herons, the prothonotary warbler, yellow-throated warbler, yellow war-

David Williams/S. Bruce Craven Jr.

The tracks of trail bikes and those of an occasional confused raccoon are all that's left of the rich hardwood forest that lined the banks of the Haw River below the U.S. 64 bridge.

bler, redstart, spotted sandpiper and the Louisiana waterthrush also favor the river bottom forests as their Piedmont habitats. They can't just change life styles and diets overnight; that takes evolutionary time. They can't just go to similar habitats on other rivers. Under normal conditions, nature saturates every habitat with the maximum number of individuals permitted by the territorial requirements of each species. The "similar habitats" are already occupied; visitors are not tolerated. The hard fact now emerging from biological research is that when a habitat is destroyed, everything in it dies. A life system is obliterated.

Living within the flowing water is an entire community of animals, vertebrate and invertebrate, which requires the high oxygen content of water which has been aerated by tumbling downhill over rocks. Crayfish, hellgrammites, stoneflies, hydras, dragonflies, mayflies, caddisflies, damselflies, darters, daces, shiners, fresh-water mussels, fresh-water sponges (they're animals) generally are limited to flowing water, or at least most species of them are.

Preying on the river's fish, salamanders, frogs and invertebrates are numerous reptiles; the snapping turtles, river cooter, northern water snake, eastern ribbon snake, eastern kingsnake. The cottonmouth is a viper of the Coastal Plain; it is rare in the Piedmont. We may find some of these reptiles unlovable, but they are still part of the river's natural life scheme. So, too, are the bobcat, river otter, and beaver, all present in the Haw and New Hope drainage. In the Piedmont, these mammals symbolize the essence of wilderness and they are strictly limited to the bottom land forests. The Jordan dry lakebed is one of their strongholds.

The Corps of Engineers permits the N.C. Wildlife Resources Commission to conduct wildlife managment activities on all 47,000 acres of the project. This is an arrangement the Commission values and, on behalf of the State's wildlife and sportsmen, is anxious to continue. Since 1975 the land has been designated by the Commission as the New Hope Game Lands and the habitat maintenance and development activities there include the planting of annual and perennial crops to benefit deer, doves and other wildlife. In 1975 and 1976, Commission biologists released 75 deer in the Game Lands; the population at least until stripping began, has been growing and officials hope that deer hunting can be permitted in the near future. Wood duck and squirrel nesting boxes have been erected. Over 20 small ponds in the area have been stocked with game fish or are otherwise being managed for fishing.

But wildlife management experts are concerned over the stripping of the land in preparation for the lake. "Obviously," says Harlan Hall, supervising wildlife biologist of the New Hope Game Lands, "the bottom land habitats are being destroyed. The bulldozer drivers are telling alarming tales of the wildlife they're flushing out — deer, bobcats, even bear! Wildlife Commission personnel are concerned about the impoundment's impact on the present balanced wildlife program developed for the area."

The B. Everett Jordan Dam across the Haw just downstream of its confluence with New Hope Creek was completed in 1974. The project has been under continuous litigation since 1971 when the Conservation Council of North Carolina and other parties filed suit to stop construction on the grounds that the lake would be too contaminated for recreation or for use as a water source for municipalities. Early in 1974, the parties agreed to a consent judgement whereby stripping of the area in preparation for a lake would be enjoined. Since completion, the project has been operated as a dry dam, thus insuring flood control downstream and creating a wilderness and natural area upstream. Legal actions also obliged the Corps to perform environmental impact studies on the proposed impoundment; the conclusions of which are that the lake, if created, will be the dirtiest body of water in the Southeastern United States, some parts of it perhaps by a factor of 20 times. The U.S. Environmental Protection Agency and the Water Quality Staff of N.C. Division of Environmental Management concur, although the EPA found it impolitic to render a final decision until forced to do so under the Freedom of Information Act.

At present, the most eutrophic lake in North Carolina is High Rock Lake on the Yadkin River. In the warmer months, High Rock's waters contain about 100 micrograms of chlorophyll "a" per liter, at which concentration the water is tinged with green. At 150 micrograms, the water becomes unclear. At 200, it is virtually opaque and devoid of oxygen. What kind of animal life is possible in such waters? Conceivably a few eels and catfish but certainly no game fish. Using the Corps' own figures, we find that the *cleanest* part of the Jordan Lake will contain more than 200 micrograms per liter after 90 percent of the point-source phosphorus has been removed from the Haw and New Hope watersheds. The removal will cost upstream industries and municipalities about $3,000,000 annually above present sewage treatment costs, and taxes will have to increase to foot the bill. Chapel Hill, for example, will have to increase its taxes by seven cents per $100 valuation to remove 90 percent of the phosphorus from its sewage effluent. Greensboro's projected costs exceed half a million dollars.

Presumably the citizens of these towns wouldn't complain about this additional tax burden if removing their share of the phosphorus would stop eutrophication in the lake, but it won't. Only one-third of the phosphorus can be identified as to source; the rest — more than enough to saturate the lake with algae — comes from agricultural runoff and urban storm sewers and cannot practicably be removed at any cost.

So, with the point-source phosphorus removed, the projected concentration will be 978 micrograms of chlorophyll per liter of water in one section of the impoundment, namely the New Hope Creek bottom lands between Durham and Chapel Hill. If the phosphorus is not removed, the count will be an unbelievable 2,316 micrograms!

"That's stinking, rotting pea soup," according to Chapel Hill Mayor James Wallace. "It will be smellable, literally and politically, all the way to Raleigh. You don't get eutrophication without an impoundment. The phosphorus is presently in the river; but only when the water stops moving, as behind a dam, does the silt settle out letting in the sunlight to power the reaction converting the phosphorus to chlorophyll (algae) and in the process removing the water's oxygen."

With this evidence before him, backed by an *Amicus Curiae* brief from the N.C. Wildlife Resources Commission asking that no water be impounded, Judge Eugene R. Gordon of the Federal District Court in Greensboro lifted the injunction in July, 1977, so that the land could be stripped and the lake created. More recently, Colonel Adolph Hight, the Corps' district engineer in Wilmington, assures us " . . . the people will have a lake they will enjoy using." It's difficult to imagine what the Colonel has in mind since his own data show that the water will be unfit for contact recreation and that few, if any, fish will live in it.

The matter is now on appeal before the 4th Circuit Court in Richmond. Although the EPA's original comment objected to the impoundment until upstream water quality is assured, its final comment, restating its reservations, was released after the 1977 trial, so it may not be admissible on appeal.

"Our only hope," says Mayor Wallace, "is for the (N.C.) Environmental Management Commission and the Wildlife Resources Commission to file briefs with the court stating that the lake is not in the best interest of the people of North Carolina."

Meanwhile the bulldozers are rumbling and we are trading wildlife for pea soup.

Michael Godfrey is a frequent contributor to WILDLIFE IN NORTH CAROLINA. Godfrey, who lives in Chapel Hill, N.C., is a natural history writer and photographer.

Wildlife In North Carolina Price To Increase

Those of you who have been subscribing to WILDLIFE IN NORTH CAROLINA for a year or more might like to take an old issue from late in the summer of 1977 and compare it to the issue you're reading. There is a difference. Actually, there are quite a few differences, and we hope that you've noticed them and found them pleasing.

We think the best is yet to come, with plans shaping up to produce an even more interesting, informative, exciting and colorful magazine about our fish, wildlife, songbirds, and other nongame animals, hunting, fishing, boating, environmental problems and responsibilities, and just about everything that is happening in beautiful outdoor North Carolina.

There is really no way of knowing how many folks read WILDLIFE IN NORTH CAROLINA, since many of the 55,000 copies go to schools and public libraries, various "waiting rooms," and other spots where one copy may be looked at by many people. We do know that the magazine is helpful to school youngsters, conservation organizations, and outdoor groups, and is used in many other "collective ways." But we still feel that we're not reaching wide segments of our North Carolina folks who would like to see it. One of the best ways to do this is not television, or telephone, but "tele-person": you tell someone else about "Wildlife in North Carolina," or if you don't like it, tell us, and tell us how you think it can be improved. We need your input and feedback to provide the type of magazine that will be interesting to our readers.

Plans are to increase the subscription rate for WILDLIFE IN NORTH CAROLINA to $5.00 per year, or three years for $12.00 beginning January 1, 1979. This increase is required to continue the present quality recently built into the magazine and to permit us to set in motion plans to bring you a bigger and better monthly publication centered around North Carolina's wildlife resources.

Stick with WILDLIFE IN NORTH CAROLINA and help to spread the wildlife word, beautifully.

Forestry Div. Seeking Old Tools

The North Carolina Division of Forest Resources is looking for donations or loans of old logging and forestry tools to use in exhibits at five of their state forests.

"We would appreciate the donation or loan of any old forestry or logging tools, said Joe Hogue of the State Division of Forest Resources. "We'd be sure to give credit to whoever donated or loaned us the equipment in the five exhibits we're planning."

The exhibits are scheduled for the Bladen Lake State Forest in Elizabethtown, the Clemmon State Forest in Clayton, the Tuttle State Forest between Morganton and Lenoir, the Holmes State Forest between Hendersonville and Brevard, and the Rendevous Mountain State Forest near North Wilkesboro.

Anyone wishing to loan or donate equipment should contact Joe Hogue at the N.C. Division of Forest Resources, PO Box 27687, Raleigh, N.C. 27611 or call 919-733-7017.

The "Good Ole Days?"

"When I was a youngster, folks knew how to handle a gun. Nowadays, most of the danged fools in the woods will shoot at anything that moves."

This old saw is a hard argument to lick because in most states, hunting accident statistics haven't been kept for very long. In North Carolina, accurate statewide statistics have only been kept since 1971. But if Pennsylvania is typical of most states, the ever-popular argument that hunting was safer in our grandfather's day doesn't hold water.

In 1977, Pennsylvania compiled its best hunter safety record with a total of 10 fatal accidents among approximately 1,280,000 hunters. North Carolina had 24 hunting accidents and six fatalities last year. Let's compare Pennsylvania's record to the good ole' days, say 1927 or 1931. In 1931, there were 72 fatal hunting accidents in Pennsylvania. In 1927, there were 65 fatal hunting accidents. In both these years, there were less than half as many hunters in the field as there are today.

Pennsylvania wildlife officials attribute the drop in the accident rate to two key factors. In 1968, it became mandatory for all youths under the age of 16 to complete a hunter safety course before obtaining a hunting license. To back this argument up, authorities point out that there were 530 hunting accidents in Pennsylvania in 1968 compared to a total of 247 last year. Officials also believe that the wide-spread use of fluorescent orange clothing has helped reduce the number of hunting accidents. In 1977, no one in Pennsylvania was killed or wounded wearing blaze orange clothing (although 25 people were shot because they were mistaken for game).

Hunting was safer in our grandfather's day? "Tain't necessarily so!"

—Mark Taylor

Union Camp Donates Land To State

The Union Camp corporation recently donated a 965-acre tract of land in Gates County to the State of North Carolina. The land will become part of the Commission's Game Lands. The gift was made through the N.C. Nature Conservancy.

"We are pleased to make this transfer," said Richard Mordecai, general manager of the Woodlands Division of Union Camp Corporation.

"We deeply appreciate what Union Camp has done," said Howard Lee, secretary of the N.C. Department of Natural Resources and Community Development. "They're setting a pace for other corporate citizens of the State to follow. It's important that we preserve as much land for wildlife as possible as the State continues to grow."

"We'll be good stewards of this land and deeply appreciate Union Camp's gift," added Bob Gordon, chairman of the N.C. Wildlife Resources Commission. "It sets a strong precedent for others to follow as we try to preserve the natural beauty and land of the State."

Ken Taylor

The Union Camp Corporation recently donated a 965-acre tract of land in Gates County to the State of North Carolina through the Nature Conservancy. Here, Tom Massengale of the Nature Conservancy, left, conveys the deed to the property to Howard Lee, secretary of the N.C. Department of Natural Resources and Community Development.

Build A Bluebird Box

Bird fanciers can help the bluebird by erecting nesting boxes. In addition to being aesthetically pleasing, bluebirds eat many insects which plague farm crops and gardens.

For information on how to build or purchase bluebird houses write to Homes for Bluebirds Inc., Route 1, Bailey, N.C. 28707.

The best place to put up bluebird boxes is on the edge of a field.

Sawdust Stove Plans Available

Folks looking for a low-cost way to heat a cabin or cottage may find the answer in a sawdust burning stove. The stove can be built by the average homeowner using a 30-gallon drum filled with sawdust set inside a 55-gallon drum. A stovepipe is attached to the top of the stove and the ash pit and draft system are located at the stove's bottom.

Detailed plans for the stove are available for $1 from the Michigan Natural Resources Magazine, Michigan Department of Natural Resources, P.O. Box 30028, Lansing, Michigan 48909.

Fish Care Booklets Available

The University of North Carolina Sea Grant program has published several booklets which may be of interest to saltwater anglers. These booklets describe in detail how to care for fresh fish, including tips on storage, preparation and handling.

For free copies of "Bringing the Catch Home," "Don't Waste That Fish," and "Home Smoking and Pickling of Fish," write to the UNC Sea Grant program, Box 5001, Raleigh, N.C. 27650.

The illustration of the big buck deer, entitled, "Late Snow," which appeared in last month's WILDLIFE IN NORTH CAROLINA magazine was reproduced from an original painting owned by the N.C. Wildlife Federation. It has been reproduced as a full color, limited edition lithograph which will be signed and numbered by the artist, Bob Binks. These prints are available from the N.C. Wildlife Federation, PO Box 10626, Raleigh, N.C. 27605 as a gift for Sustaining Membership at $35 or more for as long as the supply lasts.

July Enforcement Report

For the month of July, 1978, the N.C. Wildlife Resources Commission checked a total of 34,970 hunters and fishermen and 24,068 boaters.

Of the hunters and fishermen, 1,532 were prosecuted and 1,382 convictions were obtained. The total fines collected were $2,646 and the total costs collected were $33,930.

Of the boaters, 983 prosecutions were made and 888 convictions were obtained. Total fines collected were $1,600 and total costs collected were $20,884.50.

Other prosecutions totaled 57 and convictions totaled 55. Total fines collected were $980. and total cost collected were $1,252.

All fines and any arrests or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the N.C. Wildlife Resources Commission or its personnel.

Bald Eagle Sighting Reported

Dear Sirs:

My husband and I are delighted to report the sighting of a mature bald eagle on Sunday morning, July 30 while we were sailing up the Pamlico River. Opposite Maule Point, we spotted the eagle near the south bank of the river. He flew toward us and dipped towards the water to nearly mast-height, so that we identified him with no difficulty by eye; but we also watched him with our binoculars.

We are now interested to know if this eagle has been seen by anyone else in that neighborhood. We have not known of any being spotted there recently. This sighting makes us hope that this noble fellow was looking for a nesting place.

Sincerely,
Jacquelin D. Nash
PO Box 339
Tarboro, N.C. 27886

David Williams

Keep That Chimney Clean

The recent boom in wood burning stoves has had two undesirable side effects — chimney fires are becoming a common occurrence and homeowner's insurance rates have soared in areas where wood has become an important source of fuel. According to the National Fire Protection Association, there were 15,600 chimney fires that ignited their surrounding buildings in the U.S. in 1975. The cost of these fires in property damage was approximately $23,200,000. This represents an increase of 1,600 fires over 1974's totals. Fire protection officials state that the number of chimney fires in recent years is much higher due to the growing widespread use of wood stoves.

The solution is quite simple. Keep your chimney clean. Chimneys should be cleaned at least once or twice a year to prevent creosote buildup. Green hardwoods and any type of softwoods will cause a creosote buildup in the flue much quicker then well dried hardwoods. Also, take care not to overload stoves and fireplaces.

Nature's Ways

The Woodcock's Aerial Courtship

by Duane Raver

Joel Arrington

Many woodcocks migrate to North Carolina in the winter months, and during January, they begin an elaborate courtship ritual which includes aerial displays. This nesting woodcock refused to leave its nest even with the close approach of the photographer.

"This mysterious hermit of the alders, this recluse of the boggy thickets, this wood nymph of crepuscular habits is a common bird and well distributed in our Eastern States, widely known, but not intimately known." So Arthur Cleveland Bent describes the American woodcock, that long-billed, chunky, wide-eyed bird of the bottom lands that really doesn't look much like a bird.

One of the more interesting facets of the natural history of this slightly neglected game bird is the courtship antics that still remain somewhat shrouded in dusty reports of the early 1900's. For example:

The ritual begins as early as January in our southern latitudes, and as late as April in the New England states. The performance usually begins soon after sunset as dusk sets in. If the night is moonless, the antics end almost as full darkness arrives, and start again as dawn breaks. The final curtain for the night comes down as broad daylight approaches.

The stage is very near the nesting site of the female woodcock, usually in a swampy thicket perhaps on a grassy knoll with shallow pockets of standing water nearby. Enter the male woodcock, in full view or certainly within hearing distance of the nesting female. He struts slowly around, pearl-gray tipped tail feathers erect and spread, long bill pointed downward, almost pressed into his breast feathers. The words used to describe the sound he makes are many and really none is adequate to the task. *Zeeip, weeep,* and so on, almost like the notes a nighthawk makes as it circles the city buildings on a mid-summer afternoon. This is interspersed with a low croak or cluck, as the male woodcock approaches the setting hen.

Then the sudden leap into the air and the quick spiraling flight, higher and higher in tight circles he goes, perhaps 300 feet in the air, twittering a musical song which is said by many to be made by the bird's narrow primary wing feathers rather than by his vocal parts. It culminates in the true love song, *chickaree, chickaree, chickaree,* as abruptly the woodcock seems to tumble out of the air nearly out of control, but landing gracefully very near his starting point. And then he repeats the entire scenario, usually several times.

More than one male may get into the act, and perhaps the winner claims the final attention of the observing female bird in the gathering twilight.

Mike Godfrey

Victim of Progress?

The prothonotary warbler is a handsome inhabitant of the wooded swamps, but many of his favorite homes are being destroyed (See "Tragedy In The Piedmont" on page 16).

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by Jim Dean

Folly At Mattamuskeet

Mattamuskeet is what the Indians named the lake. It means "dry dust," which seems to foreshadow the controversy and events which took place here earlier this century.

The lake, which is a natural body of fresh water approximately 18 miles long and six miles wide, lies in Hyde County in Eastern North Carolina. Indian legend recalls a severe drought and a tremendous fire which burned for 13 moons, a distinct possibility considering the enormous deposits of peat that lie in the lake bed. Most of the lake is less than five feet deep.

Ken Taylor

The pump station at Lake Mattamuskeet with its distinctive tower no longer serves to drain the huge lake. For many years, the station was a popular waterfowl hunting lodge. Now it is an idle landmark.

For at least a century, men had eyed the potentially rich farmland beneath the shallow waters; and in 1789, a board was appointed to find a way to drain the lake. In 1835, the State Legislature authorized drainage of the lake, but funds were lacking. Again in 1909, efforts were renewed, including the funding from a $500,000 bond issue. Canals were dug and a pump station erected, but heavy rains, wind tides and flooding stalled progress.

The State then gave up and sold its holdings to a Massachusetts company, which in turn failed and sold out to an Ohio firm. In 1925, an 81-year old multimillionaire, August Hecksher, took over the project. Hecksher, a New York philanthropist and builder of model tenements, was determined to see the drainage succeed.

The revamped pumping station was a miracle of modern technology with four centrifugal Corliss engine steam pumps, each capable of pumping 250,000 gallons of water per minute. With this equipment, all canals could be pumped dry in a day, and it appeared — at last — that success was in sight. The town of New Holland was laid out, highways and a railroad line were built.

Fifty-one tractors worked 13 hours per day, and 1,000 acres of rice were planted under conditions that seemed ideal. Then the problems returned. When the crop matured, it could not be harvested because it was covered with several inches of water. The elaborate pumping system refused to work properly. Likewise, the largest acreage of soybeans in the world went to waste. Other crops, including buckwheat, popcorn, lespedeza, barley, celery, asparagus, rye, oats and flax could not be harvested. A record yield of potatoes was devoured by grasshoppers and army worms. What didn't drown under poor drainage was eaten by insects.

In 1933, the grand agricultural experiment was over. In spite of bumper crops, most of the harvesting machinery was mired in knee-deep muck. Hecksher gave up, and the only things he saw drained were millions of dollars and his determination.

Curiously, the people who had lived around the lake all those years never really supported the project. With environmental insight uncommon in those years, they stoutly maintain that "the lake's been here, and the lake's coming back."

In 1934, the government purchased the lake, letting it refill. During the next 30 years, Mattamuskeet offered perhaps the finest Canada goose hunting in the world before changing feeding patterns caused many of the geese to winter farther north on the DelMarVa Peninsula. The pump station became a hunting lodge, famous for its atmosphere and hearty food.

Today, a portion of Mattamuskeet is operated as a National Waterfowl haven, and a significant link in our natural heritage.

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Nature's Ways *By Duane Raver*
Illustrated by Durant Ball

Front Cover *By Hanson Carroll*
Few scenes are more thrilling to a waterfowler than that of a proud dog delivering a clean kill.

Back Cover *By Peggy Payne*
Gnarled cypress are common in the bay lakes of Southeastern North Carolina.

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By Peggy Payne

Our Mysterious Carolina Bays

Did a shotgun blast of meteorites score a direct hit on Eastern North Carolina eons ago? If not, what caused these unique oval-shaped depressions?

Turkey oak grows in the bare white sand, and small pines break the glare a little. But this raised rim of a bay is almost desert-like. Deer that spend their days under the canopy of swamp forest cross here at night, leaving tracks on the open ground.

Only the fox squirrel thrives on this harsh terrain. It is a small space that belongs to him.

The rim rises, slightly, three or four feet overall. Prickly-pear cactus and yucca grow on the dampening edge. Then the land descends to a circle of swamp forest and bay forest and peat bog and pond.

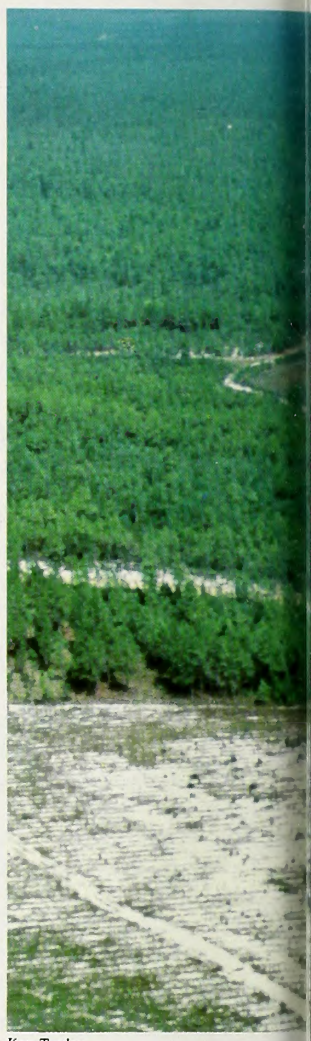
This is a Carolina Bay. How it formed is not known. Theories have ranged from a shower of meteorites to the flow of huge artesian wells, the motion of wind and water to the weight of ancient giant fish.

Peggy Payne

Sweet Bay leaves and berries are common around the Carolina Bays, and some experts have suggested that the oval depressions may have been named for those plants.

Carolina Bays are simply oval depressions with sand rims. Within some of these sand circles are lakes, crowded by heavy vegetation, growth that has caused some of the lakes to fill. Bays pockmark the southeastern Coastal Plain, from Georgia through Virginia, in a pattern with a sort of order; the axes are consistently northwest-southeast. The rims of a Carolina Bay hold dramatically different kinds of landscape side by side. But within this region where they are found they are common. Aerial photos show land splattered with ovals. Estimates number them at a half million or so.

They are concentrated in the Carolinas, though they spill into the states to the north and south. Bladen County, with its cluster of lakes, gets credit for having probably the greatest concentration. This "Bay Lakes region of North Carolina is among the few of the State's unique natural features to receive world-wide attention," a Division of Parks and Recreation master plan notes. The cluster of bays here, the report says, is "exceptional." Further to the north Lake Mattamuskeet is one of the largest of the bodies of water



Ken Taylor

Peggy Payne

Some of the Carolina Bays are quite large, and some of those which do not enclose lakes have been cleared for farming (above). Other Carolina Bays are flooded and virtually impenetrable (left).

considered to be bay lakes. Lake Waccamaw is also one of the larger bay lakes.

One estimate cites about 140,000 bays that are more than 500 feet long, with the largest about 18 miles long. The oval shape of the bays and their alignment with each other have excited much interest and speculation about their origin. A paper in *Southeastern Geology* by Walter Wheeler of the UNC Geology Department and two others is about the primary and secondary rims of Carolina Bays. But it points out that there is still no answer to how the shallow holes got there in the first place.

Any theory about the origin of the

depressions, the article says, must account for several factors: large numbers, oval oriented shape, large variation in size, bays within bays, and bays with multiple rims. The origin seems partly related to the texture of the soil. They are common in sandy loams; there are few in areas of "silty or clayey" materials.

Wheeler and company come up with some ideas about how bays get multiple rims. But "the fact remains that the exact mechanism of origin of primary depressions is not known."

One of the earliest, well-developed theories about the origin came from Melton and W. Schriever in 1932. They proposed that the bays were formed by a massive meteor shower. In 1942 Douglas Johnson speculated that they are the result of hydrologic and wind action. Artesian springs might have dissolved soluble rock formations, with waves in the resulting lakes building the shores and wind causing the sand ridges.

Another team of researchers, B.W. Wells and Boyce, maintained in a paper in December of 1953 that the cause is a composite of wind and water and meteor theories with other factors as well.

The age of the bays has been estimated at about 250,000 years. Those arguing for meteorites suppose that the shower approached the earth from a low angle, producing the northwest-southeast orientation of the bays. "If you throw a bunch of pebbles into a mud bank, you'll get the same effect," said Peter Colwell, park naturalist at Singletary Lake Group Camp.

Peggy Payne

The rims of the Carolina Bays are pure, white sand which contrast with the rich, dark peat found within each of the bay depressions.

The idea then is that with the vegetation gone, the craters filled with water, peat formed in these areas, and the present lakes are the result of peat burns. One problem with that idea is that no meteorite material has been found in lake areas.

Not everyone goes for the meteorite theory. A University of South Carolina reseacher Raymond Kaczorowski has recently written a paper saying there is no evidence to support "extraterrestrial" cause. The cause is terrestrial, he says, and is currently producing similar features in other parts of the world.

There are features much like bays in other areas that are called by other names. The Alaskan coastal plain has some oriented lakes, Dan Bliley of the Soil Conservation Service points out, but these are more rectangular than the Carolina version. In the Texas high plains there are lakes, he said, that look like they were carved by the same forces. But the shapes are different.

He thinks that the shape of the Carolina Bays is wind-caused and the original depressions could have appeared for a variety of reasons. They occur in areas that you would expect to be poorly drained, he said. He doesn't see evidence for the meteorite shower theory.

The bays are not all water-filled. Bushy Lake, a Carolina Bay, is not a lake; it is an oval of swamp and marshland. The name "bay" can lead to some confusion. An interview, arranged days in advance, with an NCSU professor who had said he was doing research on "Carolina bays" began with his launching into a discourse on the effect of the Gulf Stream on the coast of North Carolina. The bays he referred to were the salt water kind.

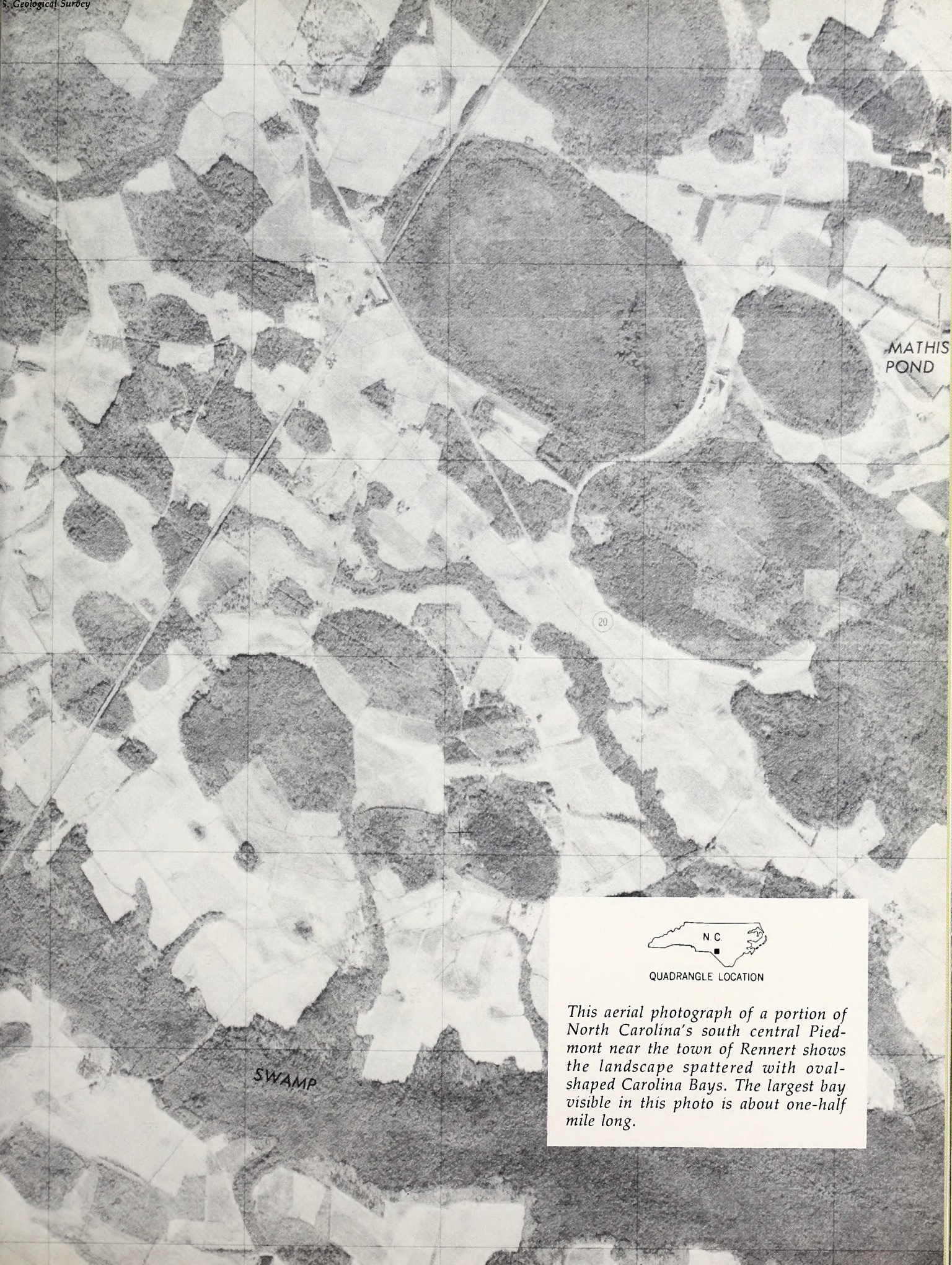
A good example of a bay enclosing a fresh water lake lies in Bladen. Singletary Lake is 572 acres encompassing most of a bay. The sandy ground of the rim shows white beyond the cabins of Singletary Lake Group Camp. Turkey oak grow here, its leaves vertical like the blades of a fan to avoid the scorching glare.

Peggy Payne

Peggy Payne

Sandwort with its small flowers is one of the plants typically found on the sandy edges of the Carolina Bays (left). Sphagnum moss (right), along with other rotting vegetation, deteriorates into peat in the Bays.

S. Geological Survey



QUADRANGLE LOCATION

This aerial photograph of a portion of North Carolina's south central Piedmont near the town of Rennert shows the landscape spattered with oval-shaped Carolina Bays. The largest bay visible in this photo is about one-half mile long.

Peggy Payne

Prickly-pear cactus is common around the Carolina Bays. The long spines can inflict painful wounds to the unwary.

Longleaf pines and wire grass are the other dominant plants.

Across the open sandy strip is a thick bay forest. The temperature drops perceptibly and the dirt turns black as you step into this wood. There are ferns by the path. Park Naturalist Colwell says the trees have gotten some credit for the name "bay." The "bay forest" is filled with red bays and sweet bays and loblolly bays. The red bay is the one that smells like "bay rum" aftershave if you crush a leaf. There are also stands of Atlantic white cedar here. These woods are thick. What distinguishes the bay forest from the swamp forest community nearby is the thick understory.

That understory spills over the lake shore into the water and continues the process of filling in that is overtaking many of the bay lakes. Jones Lake is 66 percent filled and White Lake is 29 percent filled, Colwell said. The stability of the bay lakes varies.

The beds of the bays are commonly lined with a dense mat of vegetation that turns to peat layers up to 40 feet thick. The deepest parts of the lake, never very deep, have a fully decomposed bed of "pulpy peat," according to the State Lakes Master Plan. At the northwest corner there is often an area of partially decomposed or "fibrous" peat.

The sphagnum moss that will become peat is bright green against dark wet soil in the woodland that crowds the lake. Bushes, titi or leatherwood and fetter-bushes, pile up at the water's edge. When these plants die, they will add to the peat-forming mass.

Natural sand beaches are generally on the southeast side of the lakes. Most of the Bladen lakes have vegetation along the banks, reaching over as much as ten feet of water.

The swamp forest occurs in low-lying areas in the region of bays. It is clear of understory with a thick overhead canopy — swamp gums and sweet gums and cypress, buttresses swollen from standing water. Wildlife does well here. This is habitat for deer, bear, mallards and wood ducks, otter and raccoons.

The bay forest, in contrast, is too thick for most large wildlife, though bears are found in these areas. The ponds themselves sometimes have alligators. In the region of the Bladen County bays there are two endangered species. The red-cockaded woodpecker leaves his mark in the dark cavity high on a longleaf pine, a shiny trail of sap running down the trunk. The pine barren tree frog also lives here.

The bay lakes are a species that is in some ways endangered — by forces that are natural. The process is for lake to become bay-bog as dead plants become peat.

The bays also face the kind of threats that their potential for both recreation and peat mining could bring. Peat has not been valuable in this country as an energy source, Dr. Victor Cavaroc, NCSU geologist, said. Now with energy shortages, this has changed. Peat mining is attracting interest; First Colony Farms is undertaking some experimental efforts in the northeastern part of the State.

The recreational potential of bay lakes has been more exploited. Water slides and cottages and bingo pavilions sit on the shore of White Lake. Another lake, Bay Tree Lake, was drained temporarily in 1965 by a group of private developers planning a resort, the State Lakes Master Plan recounts. The purpose was to drain the dark swamp water and make it a clear water lake. This was accomplished, but in 1972 shortly after sale of lots began "a mysterious breach of the lake rim occurred." The lake returned to the color of tea.

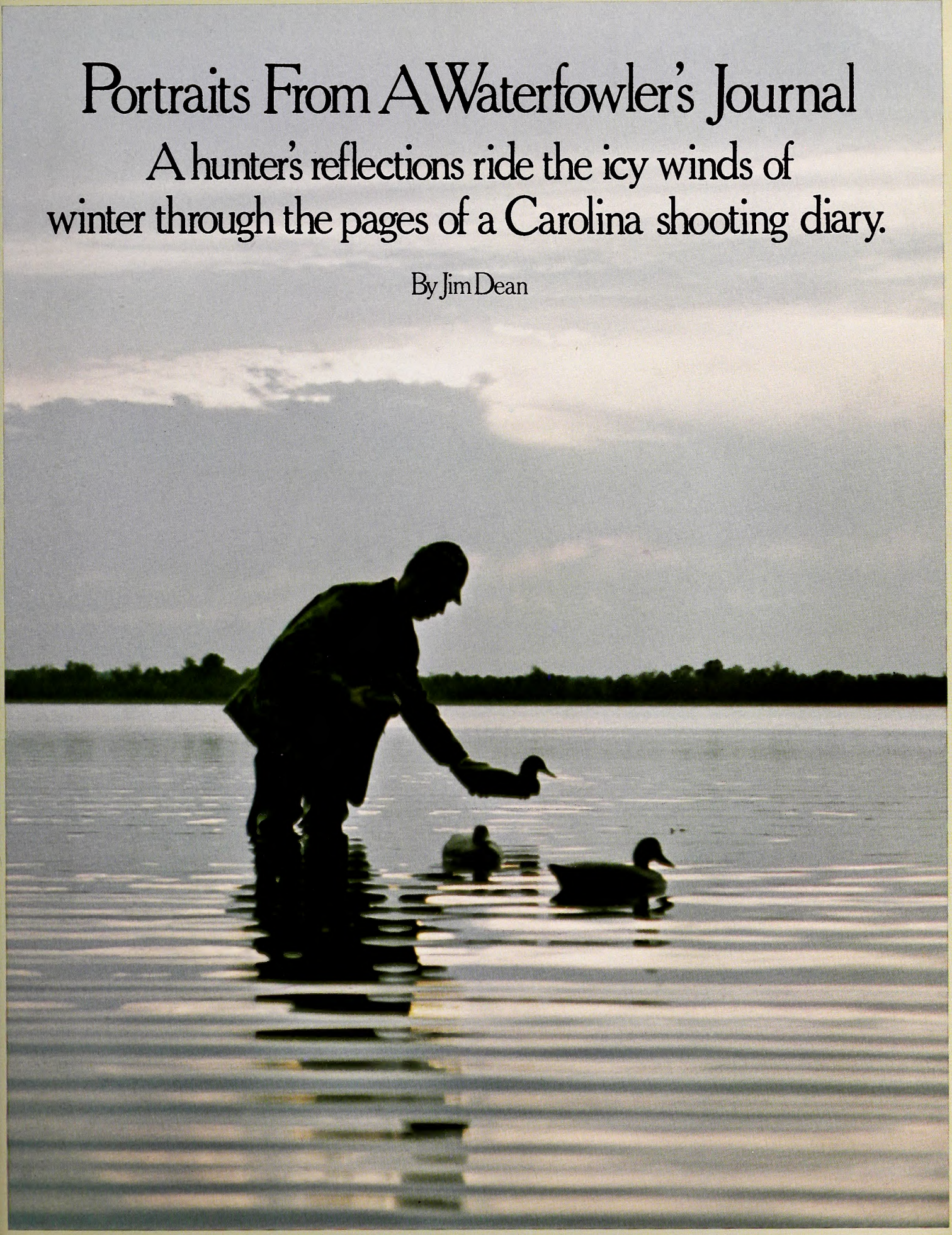
That breach is not the biggest mystery surrounding the bays. There's still no answer to the question of how a tea-colored lake in a boggy bay with a white sand rim came to be there at all.

Peggy Payne is a full-time, free-lance writer and photographer based in Raleigh. Formerly with the Raleigh Times, she now covers magazine and newspaper assignments world wide.

Portraits From A Waterfowler's Journal

A hunter's reflections ride the icy winds of winter through the pages of a Carolina shooting diary.

By Jim Dean



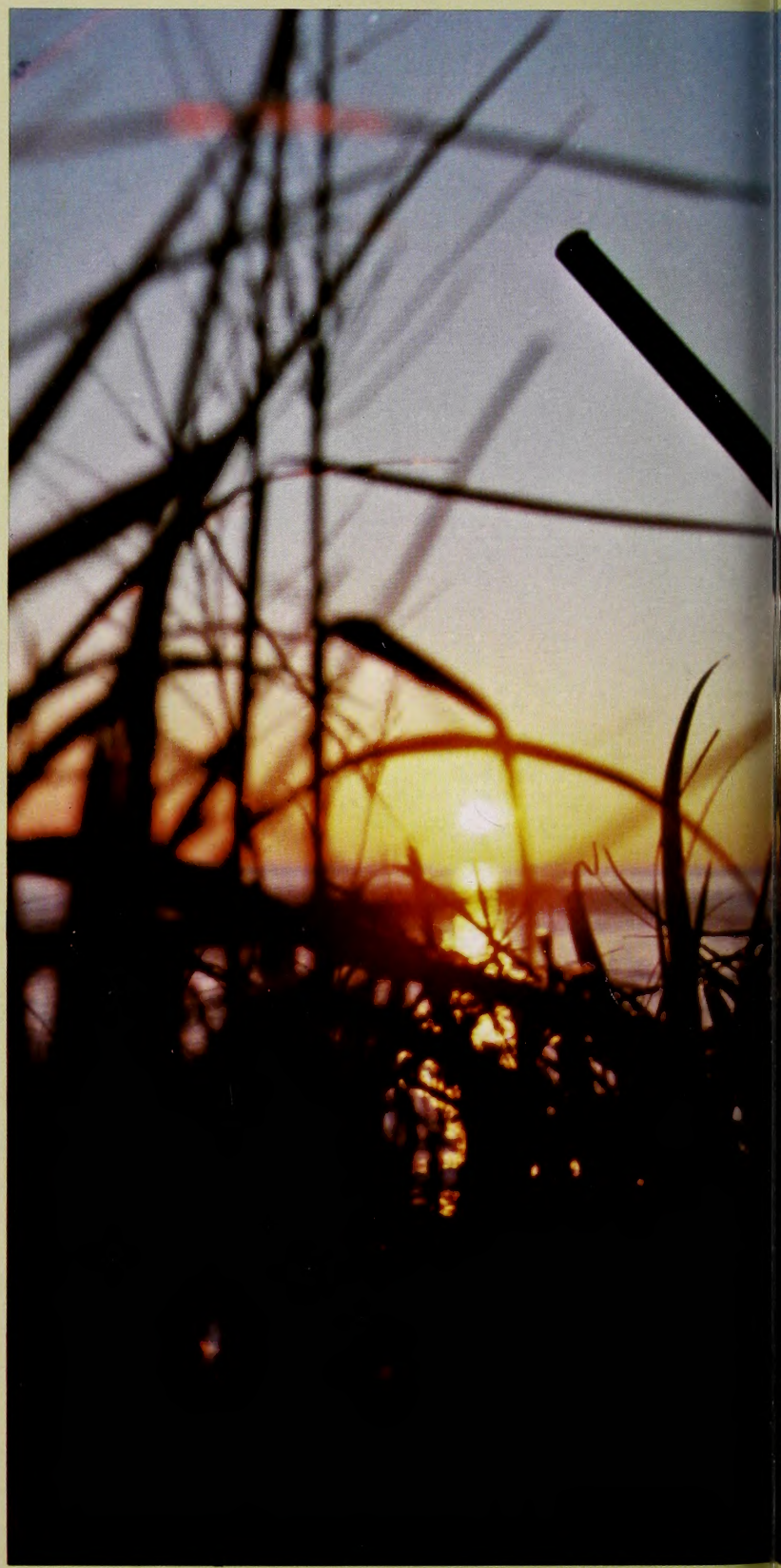
Setting out the decoys

At 4:30 in the morning, the black labrador always "works" the breakfast table for scraps, nuzzling us under our arms as we shovel in massive amounts of scrambled eggs, homemade sausage, country ham and grits swimming in redeye gravy, home fried potatoes, clabber biscuits and oyster fritters. The lab gets his share, but once in the blind, he wants no snacks or ear rubs. All business, crouched on the floor, looking out his special porthole. You can mark the progress of incoming ducks by watching his eyes.

The look you get if you miss is devastating.

You start with long johns and wool socks, and add hunting pants, wool shirts, a sweater or two and a heavy down jacket. Then you apply a skin of rain gear, gloves and rubber boots or waders until you are an immobile lump. Waddling out, you are appalled at how comfortably the guides bask in the pre-dawn chill. They stand around casually in open-necked flannel shirts or ragged sweaters with only a wrinkled slicker and rolled down hip boots to turn the spitting snow and sleet. Their bare hands cradle the stubby butts of cigarettes which glow in the darkness as they stand apart from the "sports," studying them with casual, but good-natured disdain.

Ken Taylor



Dawn watch

Hanson Carroll

Wings at first light

The frozen ground is unyielding in the pitch blackness and we stumble over the stalks of cut corn towards the blind located in one of the drainage ditches. Far behind us on the distant horizon is the warm spot of yellow light from the kitchen window. There are shapes ahead of us on the ground; goose decoys glazed with frost.

"Watch your step getting in," the guide says, "there's probably ice in the bottom."

We sit in the darkness, listening to the faraway honking of geese we cannot see. We shiver, but not from cold.

At dawn, we always lose track of what we are doing for a few moments as the edge of the sun lifts above the black lace of the distant eastern shore and the sky is instantly aflame. Dazzling light leaps across the sheet ice, scattering sparks, and you suddenly realize that you have not been breathing, but waiting for some celestial organ played by the hand of God to begin the first powerful notes of Bach's *Toccata* and *Fugue in D Minor*.

Then, at that very moment, the guide whispers hoarsely, "Get down . . ."

Hanson Carroll

Proud chesapeake

Hanson Carroll

Clean miss

The blind is a box set on spindly stakes in open water and the gray junipe skiff which has been pulled up under the floor bumps against the stakes Gusts of rain spatter the choppy, slate-colored water around the 100 or so de coys. Earlier, the teal came through so fast we never had a chance, but th mallards have turned. The old guide clucks into the call, once, twice. His face i streaked with rain and tiny icicles have formed on his graying moustache. H still loves it. You can tell.

Hanson Carroll

They're turning!

Brisk chop in Pamlico

Millpond woodie

The woodies look us over from a 100 yards out. Nine of them seem almost to hover in the failing afternoon light, then they are gone. We sit tensely, hunched against the brush, knee-keep in the pond's muck; discouraged. Our decoys sit motionless; mirrored. Suddenly, there are shadows on the mirror. Flashes of gold and green around our heads and the whistle of startled wings. Guns up. Ducks climbing. Wingbeats and thunder. One duck falls and there is a huge black blur as Squaw bolts past us . . .

The male wood duck lies on the boat seat, deep colors speckled with green duckweed and droplets of water that reflect the setting sun.

Hanson Carroll

Mallard up

The silver ladle reflects the soft red, green and blue lights from the tree as I pour the giblet gravy over the biscuits and dark slices of goose breast. Back then, a dozen years ago, I did not know that it would be our last holiday hunt at Mattamuskeet. It seems fitting that the best Christmas dinner we ever ate was delivered by Lemmie Cahoon's yellow labrador.

Hanson Carroll

got this 'un, boss

Ken Taylor

A smorgasbord of choice victuals awaits the sportsman in those high class country stores where bottle caps pave the driveway. You can have all the things your mother wouldn't let you eat. How about a sardine and cracker for starters?

Jim Dean

Jim Dean

Country Store Gourmet

By Jim Dean

A moveable feast through the gastronomic delights and disasters of sportsmen.

Rare is the hunter or fisherman who can accurately be called a gourmet or epicure. Quite frankly, most of us think that "Chateaubriand for two" is a love nest in a shabby French hotel, or that an "aspic" is something you wear around your neck.

And yet, the outdoorsman has a very special — some would say unusual — appreciation for food. This appreciation, or perversion, inevitably manifests itself away from home. For example, at home I cannot eat a tomato unless I first pick out all the seeds, and the only green vegetable I like is key lime pie. But let me spot a raw, dirt-stained turnip in a field while I'm bird hunting, and I'll wipe it on my pants and devour it with the gusto of a starving hound.

If I'm hunting, I'd rather take a lunch break at a country store than have it catered by the finest restaurant on the continent. If I'm on a wilderness trout stream, happiness is a couple of mashed liverwurst and onion sandwiches. I might turn up my nose at a water-spotted wine glass at home, but I'll drink contentedly from a woodland spring clogged with dead leaves and live salamanders.

Why is that? Who knows really. It seems that food and drink just taste better out there; and no doubt you — like me — have fond memories of such things as oysters roasted on a November beach, or peach cobbler cooked in a dutch oven buried in embers of a dying campfire. Or maybe it's vension tenderloins simmered in butter and sour cream in a downeast deer camp or mountainous breakfasts served at 4:30 in the morning by the wife of a waterfowl guide.

Most of my fondest outdoor memories have nothing to do with fish caught or game killed. Though it's been years, I still remember the "Great Fairfield Oyster Orgy" that followed a day of goose hunting at Mattamuskeet when my dad made the ill-advised offer to buy me all the oysters I could eat. I had 'em raw, steamed, stewed and fried, and even managed to get a couple of oyster fritters just barely past my vocal cords before staggering back to the car.

Then there was the time I made chili for my companions Joel Arrington and Tom Earnhardt on a trout fishing expedition. While they watched with interest — or maybe it was alarm — I tossed a double handful of chili powder and red pepper into the iron pot with the beef, tomatoes, onions and beans. We left it simmering over a low fire while we scattered out to fish the stream. The whole valley reeked of chili, and when we returned I raised the lid for a quick sniff and promptly lost most of the hair in my nose. Tom credits my chili with curing a congential sinus condition.

One cold October day, with a stinging rain riding a stiff northeast wind, I stood alone on the end of an ocean pier plugging for bluefish. After awhile two fishermen joined me and I could see right away that they were better prepared for this kind of fishing by a long shot — not to mention several short ones. After taking a couple of nips, they set about lighting the only thing that was not already well lit, a small charcoal grill they'd brought.

While one tended the grill, the other began fishing. He launched a wobbly cast into the teeth of the gale. No sooner would his plug hit the water than a two-pound bluefish would grab it. The cook would split the fish, sling out the innards and place it skin up on the grill.

My friends graciously offered me grill space for my blues, and a snort for my health. During the next hour, we caught and ate perhaps a dozen crisp, delicious blues; and my health

Jim Dean

Ken Taylor

Pour peanuts in a soda, dip vienna sausages in mustard or spread a little potted meat on a cheese nab. Anything goes, but just don't read the label.

Jim Dean

Jim Dean

Ken Taylor

was so improved that when I finally judged it prudent to leave, I merely leaned back on the wind and sailed down the pier to a safe port.

An appreciation for oysters, chili or grilled bluefish is not hard to understand. What is less easy to explain is the sportsman's fascination with the kind of food one finds in country stores. A man of impeccable breeding, exquisite manners and unquestionable taste will deny his heritage after following a brace of bird dogs all morning and gorge himself on the most incredible array of swill. There is something about a can of sardines or pickled pig's foot that is absolutely irresistible to a hunter or fisherman.

If you have never dined in a four-star country store, you are culturally deprived. There is, of course, no Michelin Guide to assist you in the selection of a superior country store, but I can tell you what to look for.

It has been my experience that the food is better in those country stores where the driveway is paved with old bottle caps, relieved by a single, rusty gas pump. In the dusty windows of the weathered building, you should find at least one very old movie card advertising a double feature starring the likes of Tom Mix, the Durango Kid or Lash LaRue.

Once inside, it is proper to nod to the maitre d' who will be leaning against the counter in his overalls, picking his teeth with a toothpick. Others diners may already be seated on upended drink crates around a pot-bellied stove chewing tobacco, pouring peanuts in their soft drinks and spitting on the hot stove to hear it sizzle.

In order to appreciate the atmosphere, one must not hurry. Pause and breath deeply, sorting out the various scents of fertilizer, seed, leather, dust and tired feet. Look around. On the wall, you will find everything from harnesses to hankies, Barlow knifes to radiator belts. You may even find something you've always wanted, like a little perfumed chenille skunk to hang on your rear view mirror to mask the musk of working mutts. My favorite store has a sign on the wall that says:

"We will crank your car and
hold your baby, but we sell for
cash and don't mean maybe."

Carefully sniff the jars of pickled eggs and pig's feet. I cannot recommend too highly any pickled sausages you might find. Sometimes, if you are truly in Mecca, you will find a keg filled with salt herring.

On the counter of every country store worthy of the name, you will find a wheel of greasy rat cheese. Buy a slab. Even if you don't like cheese, its ingestion may help offset any unpleasantries occasioned by the rich mixture you will soon savor.

On the shelves will be cans of vienna sausages, salmon and tuna, sardines, hash and potted meat. Avoid reading the label on the potted meat unless you are uncommonly interested in the final disposition of such items as pork snouts, beef hearts and stomachs, assorted lips and a variety of less distinguished cuts.

Elsewhere, you will find nabs, wrapped sandwiches, 12-gauge peppermint sticks, candy bars, cookies in jars and a vast assortment of cupcakes, raisin cookies, cinnamon buns and pies.

I have one hunting companion whose favorite country store lunch is a large can of whole, peeled tomatoes and a watery chocolate drink. I personally consider that an ostentatious show of redneck; but if your taste runs to such extremes, you are certainly free to indulge.

My own taste runs heavily to dill pickles, rat cheese, potted meat scooped out of the can with peanut butter crackers, cold pork 'n beans, magnum orange soft drinks and coconut candy bars.

Once, while several of us were dining at a country store, my son Scott noted that his can of pork 'n beans contained only a single, small chunk of fatty pork. "That is to be expected," explained our companion, Joe Phillips. "There is never more than one chunk of pork in a can; otherwise, they would call it 'porks 'n beans.' "

As I have said, I cannot explain the almost universal appeal among sportsmen for meals of this nature; but if I had to guess, I would say that it reflects some primeval lust for independence. As a kid, I was constantly being reprimanded for squandering my weekly allowance on similar items in the neighborhood grocery instead of forthrightly facing the daily onslaught of boiled collards, cabbage, rutabagas and snap beans thought necessary for proper growth.

Perhaps it is the shuddering recollection of those collards that drives me across the bottle caps and through the threshold to the herring keg and the potted meat. I only know that once there, I am in the midst of gastronomic glory; and sometimes, as I sit contentedly on a drink crate watching a cut-throat game of checkers, I feel moved to offer a judgement.

"It was," I might say, "a good pig's foot, but not a great pig's foot."

Jim Dean is associate editor of WILDLIFE IN NORTH CAROLINA. He researched this article at countless country stores and at least one emergency ward.

By Charles Elliott

A Coon Hunter Never Sleeps

Chasing the ringtail is traditionally American, harkening back to the pioneer days of the nation.

For various reasons, moonlight holds a fascination for many people. Since certain of those fascinations are now far beyond practical pursuit for some of us, I find myself relegated to that clan not yet too far advanced in autumns to indulge in less complicated pleasures by moonlight — such as coon hunting.

Chasing the old ringtail is traditionally American, since the pioneer days of our country. The raccoon is basically an animal of the trees; and in the early days; a large portion of our land was covered with extensive forests. The first settlers and frontiersmen found him a valuable asset because his fur and meat played an important role in our expanding empire.

There was one period in Tennessee's history when coon skins were used for money and they were valued in North Carolina and other states as a means of barter.

Through the generations, the raccoon has held his proper niche as a distinguished member of the American sporting scene. Today, as in the old days, he can run the legs off a pack through the gusty night; and when his hide is nailed to the barn door, it is with distinction befitting his eminence.

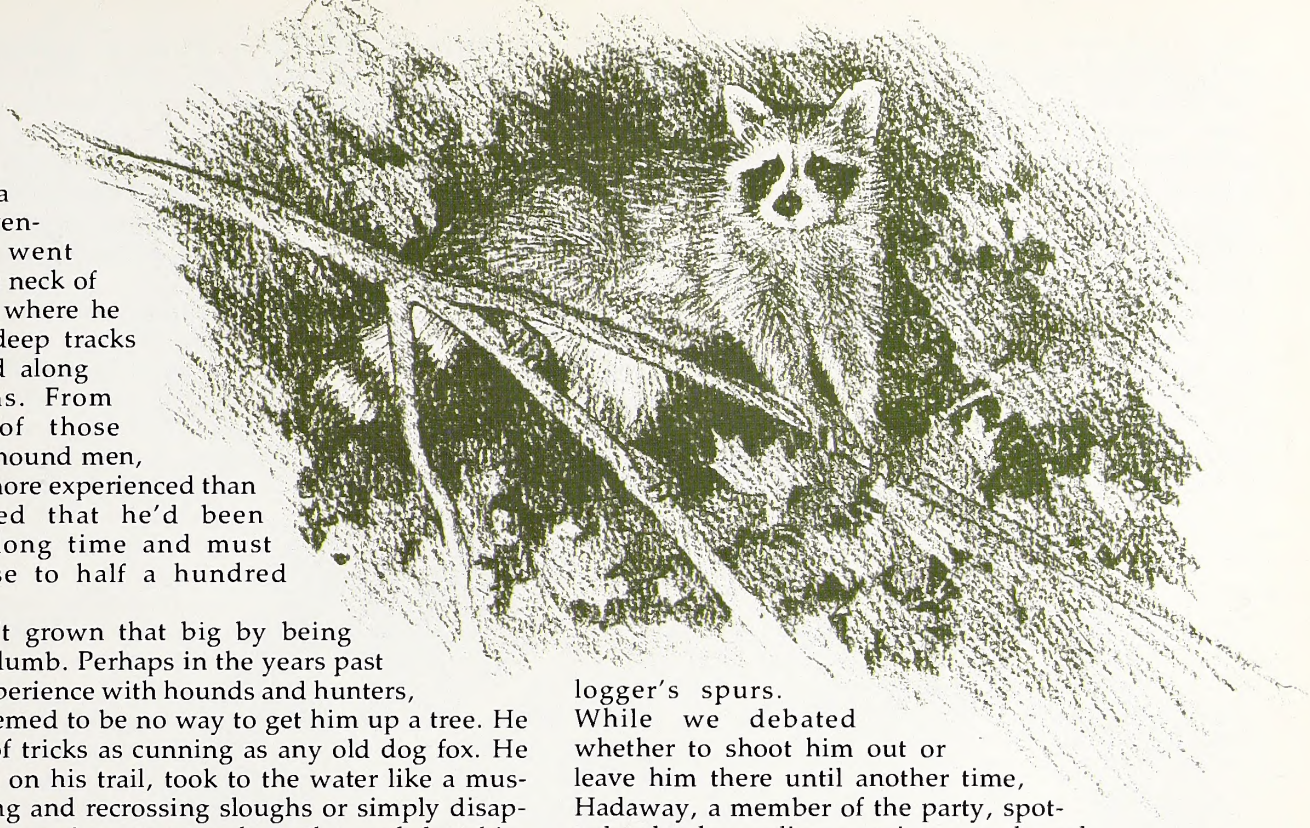
The raccoon is a game animal in a class all its own. He belongs to a hardy breed of guys who follow their packs through the hours when the sun has gone. In the deep woods he's as tricky as a fox; and when he's cornered, he'll stand up to a hound twice his size. If he can get a dog in the water, an old boar ringtail will come pretty close to drowning it, unless the dog has gumption enough to make a beeline for the bank.

I may not have been born on a coon hunt, but my association with the animal goes back about that far. I've followed the hounds almost since I was old enough to walk. I remember stumbling through the swamps on bitter cold nights, trying to keep up with the lantern carried by a hunter. I splashed through some creeks and fell into others and sat shivering like a wet puppy while one of the hunters climbed to shake a coon out of the top-most branches of a tree. There was a time or two that the animal almost fell on me; and when the pack piled in, I was right in the middle, wondering whether the dogs had mistaken me for the coon or the coon thought I was one of the hounds. I was saved when my lean swamper friend plucked me out of the middle of the fracas.

In those days fur was valuable and the men I hunted with never let one of the ringtails get away if they could help it. They carried axes and would chop down a sizable tree if there was no way it could be climbed. A coon hunter wouldn't dare do that today, even if the tree was on his own property. A large oak is more valuable than the hide of a raccoon.

I went through those years when the demand for coon hides, like most other furs, was practically nonexistent. Raccoon prices dropped from $20 to little more than a dollar. We hunted through the moonlit nights for fun instead of fur and meat. Skinning out an animal wasn't worth the trouble and we let most of them go. Sometimes, we'd shake one out of the tree to see a fight; but normally we'd shine his eyes, leave him perched safe and high in the limbs of a tree and go look for another race.

A couple of my hunting partners and I stayed on the trail of a large boar coon for a couple of seasons. We didn't devote all of our hunting time to him; but



whenever we felt the urge for a dramatic evening, we went back to that neck of the swamp where he left large, deep tracks in the mud along the streams. From the size of those prints, the hound men, who were more experienced than I, estimated that he'd been around a long time and must weigh close to half a hundred pounds.

He hadn't grown that big by being careless or dumb. Perhaps in the years past he'd had experience with hounds and hunters, for there seemed to be no way to get him up a tree. He had a bag of tricks as cunning as any old dog fox. He backtracked on his trail, took to the water like a muskrat, crossing and recrossing sloughs or simply disappeared in a running stream where the pack lost him entirely.

When by some fluke the dogs got too close, he'd hole up in the ground. Nothing shallow, like a hollow tree or a crevice in the rocks. Whenever he went down, he went deep and there wasn't a way to get to him except with a power shovel. We tried smoking him out a time or two, but the lairs he chose were beyond where the smoke would reach.

One of his favorite hideouts deep in a hillside bluff was a rocky cavern that seemed to have no bottom. It was too narrow for a hound to squeeze into. When he holed up there, we gave him up and went to look for another race.

We decided to try a trick of our own. The next time we jumped him in the vicinity of the cavern, one of our partners took two of the dogs on leash and waited at the entrance of the hole in the bluff. That night our quarry must have sensed something, for he took off down the creek and the race went out of hearing. We released the other two dogs and they too disappeared. We didn't hear nor see the pack until the next morning, when they straggled in, dead tired.

We tried the same trick again, and this time the he-coon made straight for his den. When the race came near enough, our hunter at the den released his pair of hounds that went bellowing into the race. This was something new to the masked prowler and probably surprised and confused him so much with dogs all around that he went up the nearest tree, a tremendous white oak with its lowest branches 30 feet above the ground. It was the first time we had ever caught him in a vulnerable situation.

We gathered around, with the dogs jumping against the base of the tree. Our quarry had gone into the topmost branches and I finally spotted his eyes with my flashlight. He looked like a big one. Wiley, one of our hunters, wanted him alive; but there seemed to be no way to get up that white oak trunk without the use of logger's spurs.

While we debated whether to shoot him out or leave him there until another time, Hadaway, a member of the party, spotted a slender sapling growing near the oak.

"Let me at it," he said.

Shucking off his coat, he shinnyed up the sapling and swung back and forth until he was close enough to catch one of the massive lower limbs of the oak. We watched him with the flashlight until he went out of sight into the topmost branches.

We couldn't see them, but we could hear the two up there, with Hadaway grunting and the coon growling. We could tell they were climbing higher. Hadaway finally backed the animal out on a limb, as far as either of them could go. He shook the coon out and it fell through a network of branches that slowed its rapid descent.

Wiley, the dogs and I were on the ringtail when it hit the ground. He was as big as we thought and savage, and didn't seem to be overly fond of us or the pack. The hounds didn't like us either, for trying to keep them off. With both the dogs and coon chewing on Wiley, then on me, I managed to keep the howling canines crowded back long enough for Wiley to get our quarry balled up in his hunting coat and tied with a piece of cord.

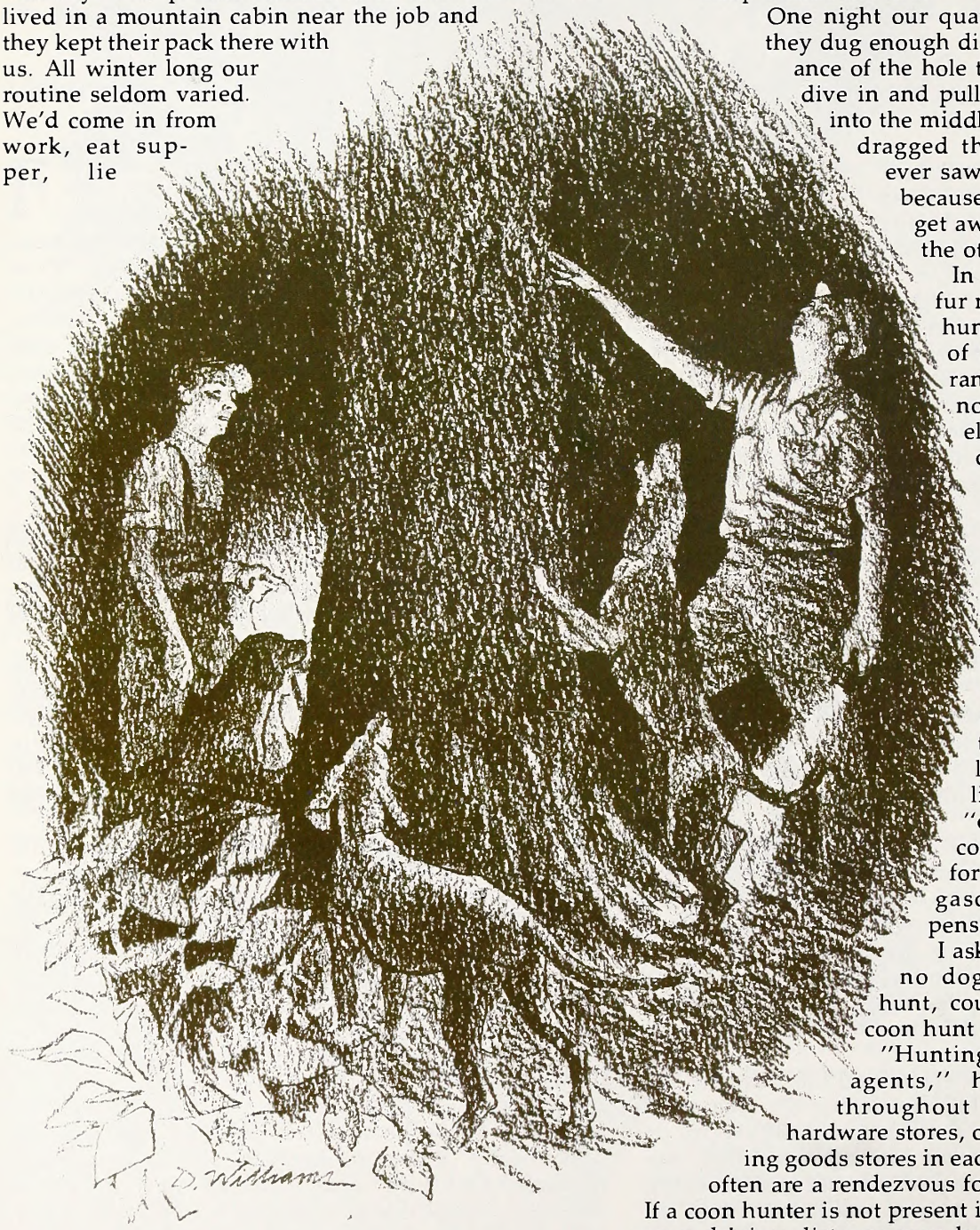
Hadaway reached the lower limbs again, but the sapling he had climbed was out of reach for any creature but a bird or squirrel. It looked for a while like we'd have to walk back to the house for an ax and chop Hadaway back to earth. After a quarter hour, with us giving him unheeded advice, he finally managed to get up enough courage to work his way out on one of the springy lower limbs of the oak. He rode it within 20 feet of the ground and dropped into the soft leaves and humus.

Wiley, with the bundle of raccoon on his back, and I were so interested in our partner's plight that we forgot about the coon. We figured later that it had probably worked its head out of the coat and was trying to pull the rest of its body out. All of the dogs must have seen him at the same time. They hit Wiley in a canine wave that caught him off balance and sent him sprawling into the leaves. I jumped in to help him and never got into

Illustrations by David Williams

such a dog fight in my life. Hadaway picked up a stick to give us a hand; but by the time we beat the dogs off, the coon was gone with the pack after it. As far as I know, he's still in that swamp. But we made a unanimous decision that any one raccoon that could whip a pack of dogs and three men, had earned its freedom at least one more time.

One winter I worked on a trail crew with three mountain boys who prided themselves as coon hunters. We lived in a mountain cabin near the job and they kept their pack there with us. All winter long our routine seldom varied. We'd come in from work, eat supper, lie down and sleep for two or three hours and then go coon hunting. A little before daylight, we'd come back to the cabin, eat breakfast, and sleep for another two or three hours before going back on the job. They were as lean and tough as lighter knots and I soon got that way.



I cheated a little. When a coon went into a hole, they built a fire and dug the animal out if it wasn't too deep. While this was going on, I stole another hour or two of sleep beside the fire.

One night our quarry wasn't too deep, so they dug enough dirt from around the entrance of the hole to let one of the hounds dive in and pull the creature out. Right into the middle of hunters the hounds dragged the maddest skunk you ever saw. I got most of the load because I couldn't wake up and get away from there as fast as the others.

In recent years, with the fur market at low ebb, coon hunting waned over much of the animal's southern range. North Carolina was no exception, but now as elsewhere, it seems to be on the increase. Wildlife Biologist Randall Wilson, the North Carolina Wildlife Resources Commission's Fur Project Leader, tells me that more hunters are coming back to the nighttime sport, and one of the reasons is the high demand for long-haired furs. "A diligent hunter," he says, "can harvest enough raccoons in one season to pay for the cost of his dog food, gasoline and other expenses."

I asked how a man who had no dogs and no territory to hunt, could manage to go on a coon hunt in the State.

"Hunting and trapping license agents," he said, "are found throughout the State at many hardware stores, country stores and sporting goods stores in each county. Many of these often are a rendezvous for sportsmen of all sorts. If a coon hunter is not present in the group, one within easy driving distance may be recommended to you. Since all coon hunters are a sociable breed, most would welcome the company of a guest and the chance to show off their best hounds.

"Our Raleigh office is also able to supply the address of the local wildlife officer, who in turn may be able to place you in contact with a group of local coon hunters in a particular area."

It might turn out to be one of those nights you will never forget.

Charles Elliott has been a field editor for OUTDOOR LIFE for more than 20 years, and has written countless articles on hunting and fishing. His most recent book is "Prince of Game Birds: The Bobwhite Quail," published in 1974 by the Georgia Department of Natural Resources.

PCB's A National Problem

The recent dumping of PCB's along 210 miles of North Carolina's highways has focused attention on these toxic substances. Estimates of the cleanup costs in North Carolina run into millions of dollars, but officials admit that any estimate is still a rough guess. The three New York men charged with dumping the chemicals are being indicted under seven criminal charges in North Carolina, with a possible maximum sentence of 42½ years in prison for each man. Federal indictments could add another eight years to each man's sentence. Although the environmental effects of the spill are yet unknown, the N.C. Wildlife Resources Commission is just one of the State agencies monitoring the situation. The Commission has been studying PCB concentrations in doves, rabbits and fish in the immediate area of the spills.

North Carolina is not the only State grappling with PCB problems. According to the National Wildlife Federation, New York and Michigan also have large-scale PCB problems.

The state of New York is now asking the federal government for $25 million to clean up the PCB pollution in the Hudson River. PCB contamination in the Hudson River and in the Chesapeake Bay in the Mid-Atlantic States has been earmarked as one of the causes of the decline in striped bass populations along the East Coast. The Chesapeake Bay, and to a lesser degree, the Hudson River, are the two prime nurseries for the Atlantic Coast population of striped bass.

PCB's are also a problem in the Great Lakes. The state of Michigan recently warned fishermen not to eat more than a half-pound of salmon per week caught out of Lakes Michigan and Huron, due to high PCB concentrations in the fish.

There's also some good news. The Environmental Protection Agency has proposed a ban on the manufacture, use and importation of PCB's in the United States. These highly toxic chemicals are used primarily as insulating fluids in electrical equipment. If passed, the ban would be effective this January 1. A voluntary ban has been in effect since last year in this country. According to the EPA, more than a billion pounds of PCB's have been used by American industry since 1929, and approximately 440 million pounds of the toxic chemicals are now loose somewhere in our environment.

— Mark Taylor

Watch For Dyed Birds

Residents of eastern North Carolina may spot some rather strangely colored shorebirds this year as the result of a research project being conducted by the Canadian Wildlife Service. Biologists from that agency are attempting to identify the migratory routes of these birds as they make their annual trek from the Canadian Arctic to South America. The birds were caught at James Bay in Canada, which forms the lowest portion of Hudson Bay. Various parts of their bodies have been dyed and metal bands have been placed on their legs.

The researchers are requesting anyone who spots one of these marked birds to note the species, date, location, combination of colors used, and the number of other shorebirds in the area. The birds are being dyed yellow and orange, and observers are asked to note what color and portion of the bird was dyed. The leg bands are yellow or light blue, and information should contain the color of the band and which leg it was on. In some cases, the bands may be "above the knee" of the bird.

Any information regarding these birds should be sent to Dr. R. Morrison, Canadian Wildlife Service, 2721 Highway 31, Ottowa, Province of Ontario, Canada, KIG-3Z7.

August Enforcement Report

For the month of August, 1978, the N.C. Wildlife Resources Commission checked a total of 14,441 hunters and fishermen and 8,214 boaters.

Of the hunters and fishermen, 959 were prosecuted and 877 convictions were obtained. The total fines collected were $4,690 and the total costs collected were $21,352.

Of the boaters, 854 prosecutions were made and 783 convictions were obtained. Total fines collected were $1,598 and total costs collected were $18,546.

Other prosecutions totaled 27 and convictions totaled 23. Total fines collected were $450 and total costs collected were $540.

All fines and any arrests or witness fees were paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the N.C. Wildlife Resources Commission or its personnel.

Buzzed Birds A Menace

The community of Perryville, Rhode Island, has a rather unique problem, according to the National Wildlife Federation.

It seems that the flocks of birds around Perryville like to chow down on the berries of Russian olives. These berries, often overripe and slightly fermented in the fall, have produced a condition in the birds commonly referred to in the South as "having a snootfull."

It seems that the "birds with a buzz on" have become a real hazard. They swoop up and down highways, slam into trucks, and their dive-bombing tactics are having disastrous results. Yet local police are hesitant to charge the birds with F.W.I. — Flying While Intoxicated!

Bird Banding Results Surprising

Each year, about 1½ million birds are banded and released throughout the United States by various agencies and organizations. Some interesting stories occasionally turn up as a result of these activities, and here are a few from the N.C. Wildlife Resources Commission's Division of Game.

Commission Biologist Tom Monschein sent us this letter a while back.

"On December 29 of 1975, Mr. John L. Brookshire of Winston-Salem made an interesting find on the beach at Cape Lookout. What he found was a bird that he couldn't identify with a band on its leg. At the time, I was the local wildlife biologist in that area and Mr. Brookshire called on me to find out about this unusual bird. He gave me the band and I reported the find to the U.S. Fish and Wildlife Service."

"As it turned out, the bird was found to be a skua that was banded in Reykjavik, Iceland, on July 24, 1975. The bird was banded by an exploration group with the Museum of Natural History in Reykjavik. The skua is the world's only bi-polar breeding bird. It is a maritime bird that is gull-like in its features but resembles a minature hawk. It is estimated that it travelled approximately 3,000 miles from where it was banded in Iceland to where it was recovered five months later at Cape Lookout."

Another interesting report was sent in by Carl Betsill, a Commission wildlife biologist, concerning a dove killed near Sanford.

"Last October, Mr. Greg Bembenick of Sanford, killed a mourning dove over six years old. The bird was originally banded as a hatching year bird at the Sandhills Game Lands in Hoffman, N.C., on July 19, 1971, and was shot six years later in Harnett County on October 1, 1977. Authorities estimate that less than two percent of the doves reach this age class. Les Line, editor of Aububon magazine, recently stated in an article in *Field and Stream*, that the longevity record for doves was 16 years in captivity and 10 years in the wild." That's one old bird.

Tim Hergenrader

Bird banding often unearths some interesting stories, as the accompanying article shows. Each year, over 1½ million birds are banded in the United States. Here, biologists from the N.C. Wildlife Resources Commission and the U.S. Fish and Wildlife Service, are trapping and banding ducks.

New Snakebite Treatment On Horizon

Two Mississippi scientists may have found a new substance for treating snakebite victims that is much more effective than the treatments now in use.

Dr. Van Philpot of Houston, Mississippi, and Rune Stjerholm, a biochemist at Tulane Medical Center, have isolated the substance in the blood of pit vipers that prevents them from dying when bit by their own kind. The isolation is believed to be the first ever.

Snakebite victims are currently treated with an antitoxin obtained from immunized horses. One problem with the current treatment is that roughly a third of the population receiving the antitoxin has allergenic reactions, which sometimes prove fatal. The antitoxin also isn't effective for water moccasin bites.

The new substance that has been isolated in the blood of the viper family would be effective for treating all viper bites, which include rattlesnakes, asps, bushmasters, copperheads, and water moccasins.

Dismal Swamp Information Available

Two publications on the Great Dismal Swamp are now available from Old Dominion University. They are as follows:

"Indians From the Ice Age to the Colonial Period" explains how the Indians native to the Dismal Swamp lived. The author, Ed Bottoms, is an authority on the Dismal Swamp Indians and has conducted many archaeological digs in that area.

"The Great Dismal Swamp: A Brief Interpretation" presents a broad view of the history, ecology, geology and wildlife of the swamp.

Copies of each publication are 50 cents apiece and are available from Old Dominion University, Office of Dismal Swamp Programs, 1551 West 49th. Street, Norfolk, Virginia 23508.

Sobering Thoughts—End Of The Road In Sight?

Ted Dossett

A recent article in *International Wildlife* magazine by Editor John Strohm, entitled, "An Open Letter to Colleen" (his daughter), presents some sobering information on the state of the world's natural resources. Here are a few things to think about for a bit.

*The world's oceans provide 90 percent of all fish for human consumption. Between 1950 and 1970, the fishing fleets of the world more than tripled their catches from 21 million to 70 million tons of fish annually. But the fish catch per capita is down 11 percent over what it was seven years ago. Many of the fisheries in the North Atlantic, which supply Western Europe and much of North America, are seriously overfished.

*Although we take wood for granted, most of the world does not. In the Andes Mountains of Peru, a man must work a full day to buy all the wood he can cut and carry home in one load on his back. One out of three people on earth depends on firewood for cooking, and a severe firewood shortage exists in many underdeveloped nations.

*Much of the world's forests are being cut faster than they're being replanted. In the last 10 years, the Ivory Coast in Africa lost 30 percent of its forests. Forests that once covered a third of Morocco, Tunisia and Algeria have been reduced to 10 percent. And the world's tropical forests are disappearing under human impact at the rate of about 50 acres per minute, a loss which adds up to 72,000 acres of tropical forest lost per day.

*In recent years, the population of the world has expanded faster than the cultivated land. We now have less than one acre of cropland per person world-wide to meet our total food needs.

*Each year, the United States loses a million acres of cropland to development.

*Virtually all of the nations in the world with falling food output per capita are those with populations increasing at the rate of 15-20 fold per century.

*The amount of dust in the atmosphere caused by virtually every human activity has doubled since the 1930's, and some scientists fear this may be changing our weather. Some researchers now feel that three-fourths of all cancer may be environmentally induced.

*Each day, the earth has about 230,000 new mouths to feed with a total population growth of approximately 85 million people per year. In the last single generation, the growth of the human population has reached two to three percent per year for the first time. This may not sound like much; but at this rate, the world's current population of four billion people could double several times within the next 50 years.

*Last year, the nations of the earth spent over $400 billion on armaments.

— Mark Taylor

Hard Times For India's Froggers

India's frog leg industry is headed for troubled times, according to the National Wildlife Federation. India exports approximately 3,019 tons of frog legs yearly valued at approximately $85 million to the "frog hungry" nations of Europe and North America.

The large export rate has raised havoc with India's frog population, and the government has taken steps to reduce the harvest, lest the resource croak. Frogs in India are now protected from mid-June to mid-October, which is their breeding season. The heavy harvest rate is also hurting agricultural crops because frogs are very effective insect predators and scientists estimate that in four months one frog will devour about 20,000 of the pesky little insects. Because current harvest rates will soon wipe out the resource, scientists are looking into building "frog farms" to help meet the demand.

Article Index Available

The article index for the 1978 issues of WILDLIFE IN NORTH CAROLINA is now available upon request.

For copies of the index write to the N.C. Wildlife Resources Commission, Information & Education Division, 512 N. Salisbury St., Raleigh, N.C. 27611.

Gift To Audubon Society!

Refuge Opens At Currituck

National Audubon Society

Mr. and Mrs. Earl Slick of Winston-Salem recently donated a large tract of land on Pine Island on the Currituck Banks to the National Audubon Society for a wildlife refuge. The site was formerly part of the Pine Island Gun Club. Old shooting clubs were responsible for keeping much of the land in the area out of development.

(National Audubon Society)

The National Audubon Society recently opened a new wildlife refuge on Pine Island on the Currituck Banks.

The land for the new refuge was donated to the Audubon Society by Mr. and Mrs. Earl Slick of Winston-Salem. The site contains over two miles of wild beach on the seaward side of the island and over 3,600 acres of prime marshland on Currituck Sound. The new refuge lies about 20 miles south of the Virginia-North Carolina line.

Slick, a Winston-Salem businessman and an avid waterfowl hunter, has been active in North Carolina conservation circles for many years. He has owned the site of the new refuge since 1972, and wished to see it preserved in a wild state.

The site was formerly part of the Pine Island Gun Club, one of Currituck's famous waterfowl shooting preserves. The shooting clubs have been active since the end of the Civil War, and in their heyday, attracted wealthy sportsmen from all over the world. Club owners and members also supported the Audubon Society in its efforts around the turn of the century to protect waterfowl and to end commercial market hunting.

The Audubon Society is also establishing a million-dollar endowment fund to meet the costs of maintaining and protecting the sanctuary for the future. The Slick's have offered to add $250,000 to the endowment fund if the Audubon Society can match that amount.

Currituck Sound is the wintering area for more than 15 percent of the ducks and geese in the Atlantic Flyway.

Early Carolina Hunting Accidents

When did the first hunting accidents occur? According to John Lawson, an early naturalist who traveled throughout North and South Carolina at the turn of the 18th century, the first inhabitants of this land frequently killed each other while hunting. This account taken from his journals described meeting Indians near Lake Marion in South Carolina, and sheds an interesting light on the Indian's method of hunting.

"He was the tallest Indian I ever saw, being seven Foot high, and a very strait compleat Person, esteem'd on by the King for his great Art in Hunting, always carrying with him an artificial Head to hunt Withal: They are made of the Head of a Buck, the back Part of the Horns being scrapt and hollow for Lightness of Carriage. The Skin is left to the setting on of the Shoulders, which is lin'd all around with small hoops, and flat Sort of Laths, to hold it open for the Arm to go in. They have a way to preserve the Eyes as if living. The Hunter puts on a Match-coat made of Deer's Skin, with the Hair on, and a Piece of the white Part of a Deer's Skin, that grows on the Breast, wich if fasten'd to the Neck-End of this stalking Head, so hangs down. In these Habiliments an Indian will go as near a Deer as he pleases, the exact Motions and Behavior of a Deer being so well counterfeited by 'em, that several Times it hath been known for two hunters to come up with a stalking Head together, and unknown to each other, so that they have killed an Indian instead of a Deer, which hath happened sometimes to be a Brother, or some dear Friend, for which Reason they allow not of that Sort of Practice, where the Nation is populus."

Lawson was mistaken on one point, the Indians didn't preserve the eye of the deer for their costumes, they used the large polished seed of the American horse chestnut in its place. Hence its nickname "buckeye."

— Mark Taylor

Nature's Ways

King Of The Ducks

written by Duane Raver painting by Durant Ball

The "ski-slope" forehead, thick neck, dark breast and nearly pure-white underparts and back characterize the distinctive canvasback male. The female has much the same conformation, but is a cinnamon brown on head, neck and breast instead of the male's chestnut red head and neck, and slate-grey breast. Like most diving ducks, the wings have the appearance of being set far back on the body, and the beat is more rapid than the puddle ducks' tempo. Flight is fast — maximum is over 70 miles per hour — and usually in a wedge-shaped or V-pattern flock. On the water, the canvasback rides quite low and the glossy back glistens white in the sunlight. It is exclusively a North American species not found outside the New World. It is now in short supply, and the hunting season on it and the redhead is closed.

Water conditions during the spring nesting season in the prairie pothole regions of the Dakotas, and the western half of Canada, determine the success of the broods. No canvasbacks are known to nest in North Carolina. The bird's future is doubtful, although it is hoped that far north nesting areas can be preserved and wintering grounds maintained.

The large, sturdy webbed feet, set far back on the body, enable the canvasback and all of its diving duck cousins to dive and swim efficiently for aquatic vegetation. Wild celery is a favorite plant food, which seems to be increasingly difficult to find. The canvasback is almost a gluttonous eater, fighting with its neighbors for bits of food.

DURANT BALL

Peggy Payne

Mirrored Image
The reflection of a cypress stump is pleasantly distorted in the calm waters of this Carolina Bay lake. For theories on the origin of the Carolina Bays, look on page 2.

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